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The Gift of
Charles Louis Flint,
Secretary of the Mass.
Board of Agriculture.
(H. U. 1849.)
12 Aug. 1872.

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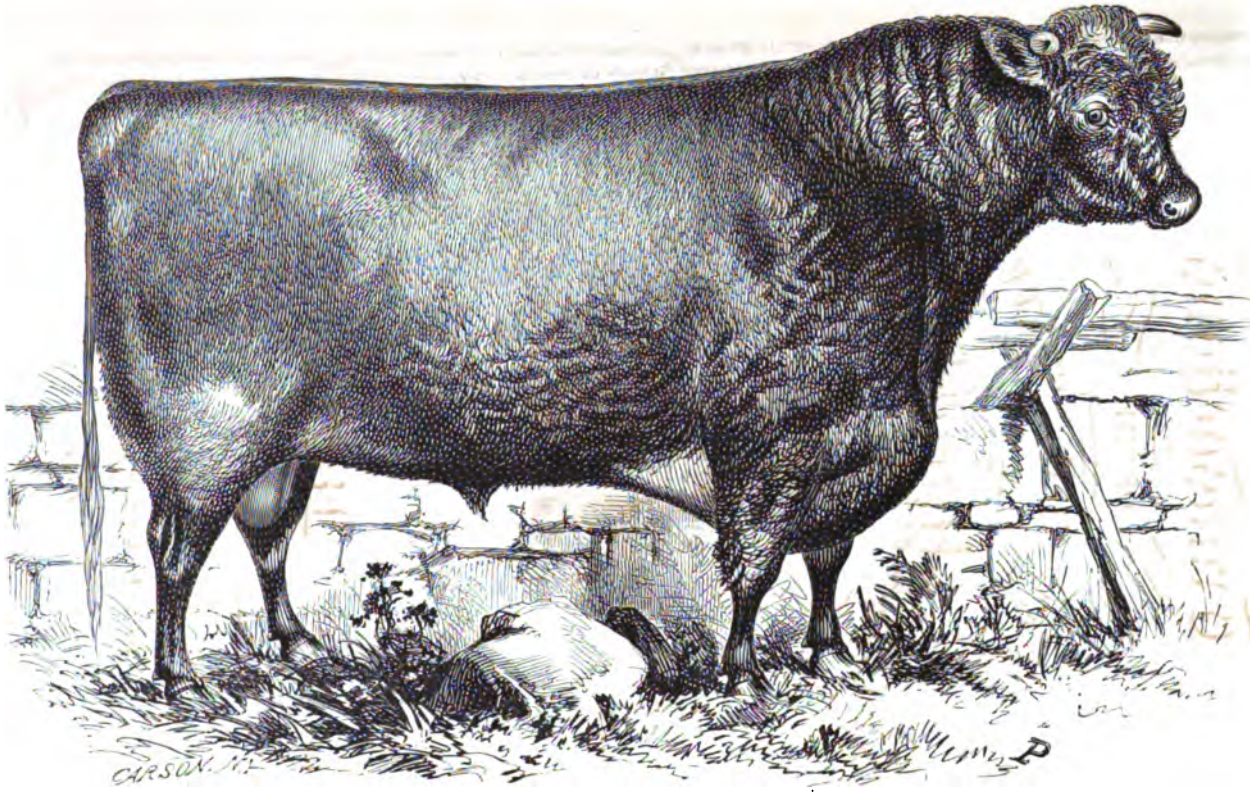

4th DUKE OF GENEVA, 7931.

Bred by JAMES O. SHELDON, Geneva; property of SAMUEL CAMPBELL, New York Mills, N. Y.; winner of the first prize, in the class of Short Horn Bulls over three years old, at the State Fair at Utica, 1870.

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Transactions

OF THE

NEW YORK STATE

Agricultural Society

FOR THE YEAR

1870.

Albany.

THE ARGUS CO., PRINTERS.

1871.

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TRANSACTIONS

OF THE

New York State Agricultural Society,

WITH AN

ABSTRACT OF THE PROCEEDINGS

OF THE

COUNTY AGRICULTURAL SOCIETIES.

VOLUME XXX—1870.

ALBANY:
THE ARGUS COMPANY, PRINTERS.
1872.

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1872, Aug. 12.
Gift of
Chas. Louis Flint,
Sec'y of the Mass. Board
of Agriculture. (X.U. 1849.)

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CONSTITUTION.

The style of this Society shall be "The New York State Agricultural Society." Its object shall be to improve the condition of Agriculture, Horticulture and the Household Arts.

SECTION 1. The Society shall consist of such citizens of the State as shall signify in writing their wish to become members, and shall pay, on subscribing, not less than one dollar, and annually thereafter one dollar; and also of Honorary and Corresponding members.

The Presidents of County Agricultural Societies, or a delegate from each, shall, *ex officio*, be members of this Society.

The payment of ten dollars, or more, shall constitute a member for life, and shall exempt the donor from annual contributions.

SEC. 2. The officers of the Society shall consist of a President, eight Vice-Presidents, one to be located in each judicial district, a Recording Secretary, a Corresponding Secretary, a Treasurer, an Executive Committee, to consist of the officers above named, and eight additional members; and five of the ex-Presidents shall be, *ex officio*, members of the Executive Committee, and these five shall consist of the five ex-Presidents whose term of office has last expired, of whom three shall constitute a quorum; and that the ex-Presidents of the Society not members of the Executive Committee, shall constitute a board of Counsellors to whom may be referred, for consultation and advice, all questions that may from time to time arise, and in the decision of which the Society may in any manner be interested; and a General Committee, the members of which shall be located in the several counties, and be equal to the representatives in the House of Assembly.

SEC. 3. The Recording Secretary shall keep the minutes of the Society. The Corresponding Secretary shall carry on the correspondence with other societies, with individuals, and with the General Committee, in the furtherance of the objects of the Society.

The Treasurer shall keep the funds of the Society, and disburse them on the order of the President or a Vice-President, countersigned by the Recording Secretary, and shall make a report of the receipts and expenditures at the annual meeting in January.

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The Executive Committee shall take charge of and distribute or preserve all seeds, plants, books, models, etc., which may be transmitted to the Society; and shall have also the charge of all communications designated or calculated for publication, and, so far as they may deem expedient, shall collect, arrange and publish the same in such manner and form as they shall deem best calculated to promote the objects of the Society.

The General Committee are charged with the interests of the Society in the counties in which they shall respectively reside, and will constitute a medium of communication between the Executive Committee and the remote members of the Society.

SEC. 4. There shall be an annual meeting of the Society on the Wednesday after the third Tuesday in January, in the city of Albany, at which time all the officers shall be elected by a plurality of votes, and by ballot, with the exception of the General Committee for the counties, which may be appointed by the Executive Committee, who shall have power to fill any vacancies which may occur in the offices of the Society during the year. Extra meetings may be convoked by the Executive Committee. Fifteen members shall be a quorum for the transaction of business. No person shall be qualified to vote at any election of officers of the Society, unless he shall have been a member of the Society for at least thirty days prior to such election.

SEC. 5. The Society shall hold an annual Cattle Show and Fair at such time and place as shall be designated by the Executive Committee.

SEC. 6. The Constitution may be amended by vote of two-thirds of the members attending any annual meeting, upon one year's previous notice in writing.

STATE AGRICULTURAL ROOMS,
ALBANY, *February* 26, 1872.

I certify the foregoing to be a correct copy of the Constitution of the New York State Agricultural Society.

T. L. HARISON,
Secretary.

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OFFICERS FOR 1871.

PRESIDENT,
RICHARD CHURCH, Belvidere.

VICE-PRESIDENTS,
1st district, THOMAS H. FAILE, JR., New York.
2d district, EDWIN THORNE, Dutchess.
3d district, JURIAN WINNE, Albany.
4th district, FRANK D. CURTIS, Saratoga.
5th district, JAMES GEDDES, Onondaga.
6th district, WILLIAM M. ELY, Broome.
7th district, BENJAMIN F. ANGEL, Geneseo.
8th district, HORACE S. HUNTLEY, Cattaraugus.

CORRESPONDING SECRETARY,
THOMAS L. HARISON, St. Lawrence.

RECORDING SECRETARY,
WILLIAM H. BOGART, Cayuga.

TREASURER,
LUTHER H. TUCKER, Albany.

EXECUTIVE COMMITTEE,
ADIN THAYER, JR., Rensselaer.
MILO INGALSBE, Washington.
JAMES W. WADSWORTH, Livingston.*
GEORGE H. BROWN, Dutchess.
ROBERT J. SWAN, Seneca.
HARRIS LEWIS, Herkimer.
JOSEPH JULIAND, Chenango.
JOHN L. COLE, Wayne.

EX-PRESIDENTS,
JOHN STANTON GOULD.
MARSENA R. PATRICK.
THOMAS HALL FAILE.
SAMUEL CAMPBELL.
SOLON D. HUNGERFORD.

ENTOMOLOGIST,
ASA FITCH, M. D.

CHEMIST TO THE SOCIETY,
CHARLES H. PORTER, M. D.

MECHANICAL AND CONSULTING ENGINEER,
HENRY WATERMAN.

CONSULTING VETERINARIAN,
Prof. JAMES LAW, M. R. V. C.

* In place of Fordham Morris, resigned on account of absence from the country.

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EX-PRESIDENTS, AND THE PLACES OF THE FAIRS.

Year.	Name.	Places of fair.
1841	Joel B. Nott	Syracuse.
1842	James S. Wadsworth,*	Albany.
1843	James S. Wadsworth.	Rochester.
1844	John P. Beckman*	Po'keepsie.
1845	Benjamin P. Johnson*	Utica.
1846	John M. Sherwood	Auburn.
1847	George Vail	Saratoga.
1848	Lewis F. Allen	Buffalo.
1849	John A. King*	Syracuse.
1850	Ezra P. Prentice	Albany.
1851	John Delafield*	Rochester.
1852	Henry Wager*	Utica.
1853	Lewis G. Morris	Saratoga.
1854	William Kelly	New York.
1855	Samuel Cheever.	Elmira.
1856	Theodore S. Faxton,	Watertown
1857	Alonzo S. Upham	Buffalo.
1858	William T. McCoun,	Syracuse.
1859	Abraham B. Conger.	Albany.
1860	B. N. Huntington	Elmira.
1861	George Geddes	Watertown.
1862	Ezra Cornell	Rochester.
1863	Edward G. Faile	Utica.
1864	James O. Sheldon	Rochester.
1865	Theodore C. Peters	Utica.
1866	John Stanton Gould.	Saratoga.
1867	Marsena R. Patrick	Buffalo.
1868	Thomas Hall Faile	Rochester.
1869	Samuel Campbell	Elmira.
1870	Solon D. Hungerford,	Utica.

* Deceased.

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LIFE MEMBERS.

[Deceased members are marked with an asterisk.]

A.

Allen, William M., Har em.
Allen, Lewis F., Black Rock.
Aspinwall, J. L., Barrytown.
Agnew, Alexander M., New York.
Allen, John, New York.*
Aycrigg, T. G., New Jersey.*
Andrews, B. H., Waterbury, Conn.
Aspinwall, William H., New York.
Abernethy, Charles, New York.
Ames, D. T., Syracuse.
Arnold, Wm. E., Otego.
Austin, J., Jr., Albany.
Adriance, J. P., Poughkeepsie.
Arnold, B. G., New York.
Agnew, Cornelius R., New York.
Angel, B. F., Geneseo.
Astor, John Jacob, Jr., New York.
Avery, Ralph H., Canastota.
Arnot, S. T., Elmira.
Amsdell, T. L., Albany.
Amsdell, George I., Albany.
Appleton, Francis H., West Peabody, Mass.

B.

Beekman, John P., Kinderhook.*
Bell, Thomas, Eatontown, N. J.
Buell, William, Rochester.*
Becar, Noel J., New York.*
Brown, Lewis B., Westchester.
Boughton, Chauncey, Waterford.
Bowen, Henry C., Brooklyn.
Burkhalter, Charles, New York.
Balcom, Uri, Oconto, Wisconsin.
Brown, Wm. Smith, New York.
Boorman, James, Hyde Park.*
Brown, Lewis M., New York.
Bradley, George C., Watertown.
Boyce, William, New York.
Brown, William J., Fairhaven.
Byram, A. G., New York.
Baldwin, Harvey, Syracuse.*
Buck, A. H., Lowville.
Burr, William M., Jr., Cazenovia.
Bulkely, D. A., Williamstown, Mass.
Bailey, Isaac H., New York.
Babcock, Samuel D., New York.
Butler, B. C., Luzerne.
Babcock, F. M., New York.
Bowne, S. R., Rhinebeck.
Bruen, Alexander M., Scarsdale.
Brooks, Daniel E., New York.
Butler, Charles, New York.
Bogart, M. D., Rockland Lake.
Barry, P., Rochester.
Bard, John, Tarrytown.
Bradley, S. W., Olean.
Boardman, Truman, Trumansburgh.
Benham, A. B., Dryden.
Bailey, N. P., New York.
Bonesteel, Peter S., Victor.
Brown, George D., Lowville.
Brown, George H., Millbrook.
Baker, B. M., Rochester.
Beebe, William, New York.
Butterfield, J., Utica.*
Bliss, Jonathan.
Brown, John Crosby, New York.
Brown, James, New York.
Barber, A. D., New York.
Baldwin, A., Yonkers.
Brizee, Teunis, Pittsford.
Baker, A. Y., Hammondsport.
Birdsall, Benjamin, Mendon Centre.
Barto, H. D., Trumansburgh.
Bowne, Robert, New York.
Beadle, E. L., Poughkeepsie.
Boyce, Ker, Flushing.
Brown, Alex'r, North Bridgewater.
Bryden, Robert E., New Hartford.
Barnard, Charles, Utica.
Brown, J. P., Utica.
Bowen, H., Medina.
Butterfield, Charles E., Utica.
Blanchard, J. H., Utica.
Burch, H. M., ———.
Baker, B. F., Ballston.
Brown, D. D. S., Rochester.
Blake, W. C., Northfield, Vt.
Beckwith, B. M., Plattsburgh.
Bennett, William H., Saratoga Springs.
Bostock, E., Albany.
Banks, John, Bainbridge.
Bartlett, H. B., Paris.
Baker, I. V., Comstock's Landing.
Butterfield, Daniel, New York.
Boswell, John, Chili.
Bell, John H., West Brighton.
Babbitt, B. T., New York.
Bicknell, J. Y., Westmoreland.
Brown, J. Emery, Churchville.
Brown, J. Tilden, New York.
Bouck, Tobias, Cobleskill.

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Bowne, Walter, Flushing.
Bristol, Wheeler H., Owego.
Buckley, Wade, Port Jervis.
Bogart, Wm. H., Aurora.
Butts, George, Manlius.
Blood, Isaiah, Ballston.*
Bell, David K., West Brighton.
Bowen, O. F., West Lowville.
Badger, G. F., New York.
Butterfield, John, Utica.
Bills, O. A., Yonkers.
Bailey, William H., Plattsburgh.
Brown, Samuel H, Millbrook.
Birnie, William, Springfield, Mass
Burden, James A., Troy.
Brown, Henry K., Newburgh.
Brodie, William A., Geneseo.

C.

Campbell, William Bayard, New York.
Corning, Erastus, Albany.
Corning, Erastus, Jr., Albany.
Clark, George, Springfield.
Coleman, Robert B., New York.*
Crocker, David, Jr., New York.*
Claflin, Horace, B., Brooklyn.
Case, Thomas R., Simsbury, Ct.
Corey, John A., Saratoga Springs
Curtis, E. L. B., Danby.
Cromwell, William, New York.
Cook, E. G., Belleville.
Campbell, John, New York.
Conger, A. B., Waldberg.
Clarke, Alfred, Springfield.*
Crane, John J., Morrisania.
Clarkson, Augustus, Potsdam.*
Chesebro, E., Guilderland.*
Catlin, D. W., New York.*
Chambers, James, Scarsdale.
Clement, Isaac, Mechanicsville.*
Cocks, Isaac H., North Hempstead.
Cornell, Ezra, Ithaca.
Crittenden, Norman, Ithaca.
Cornell, Alonzo B., Ithaca.
Cornell, Franklin C., Ithaca.
Cornell, O. H. Perry, Ithaca.
Chrystie, Albert N., Havre, France.
Chauncey, Henry, Jr., New York.
Chatfield, T. I., Owego.
Campbell, Samuel, New York Mills.
Carroll, Charles H., Geneseo.*
Cornell, Charles Ezra, Ithaca.
Cobb, Emory, Chicago.
Camp, Hugh N., New York.
Chipman, H. W., White Plains.
Childs, S. D., Utica.*
Churchill, A., Utica.*
Cogswell, W. L., New York.*
Champlin, C. B., Hammondsport.
Crosman, C. F., Rochester.*
Chatfield, A. F., Albany.
Copeman, A. S., Utica.
Cooke, Rolland C., Whitehall.
Collender, Hugh W., New York.
Coffin, Edmund, New York.
Cole, Walter, Batavia.
Coan, Luke, Westmoreland.
Clark, Leander, Newburgh.
Crofoot, James R., Constableville.
Clarke, Almonde, Whitestown.
Cary, H. N., Whitesboro.
Coulter, J. E., New York.
Cowdin, Elliott C., New York.
Curtis, Frank D., Charlton.
Carpenter, Franklin, South Corinth.
Chamberlain, D. D., New York.
Church, Richard, Belvidere.
Cady, Charles, Dryden.
Crego, Russell, Albany.
Church, Elihu, Riga.
Cooper, Joseph M., New York.
Crosman, C. W., Rochester.
Campbell, James K., New York.
Cunard, Sir Edward, New York.*
Cunningham, James B., White Plains.
Callanan, Henry, Coeymans.
Cannon, Legrand B., New York.
Crosman, C. W., Rochester.
Crosier, William, Northport.
Cossitt, Davis, Onondaga.
Champlain, Marshall B., Cuba.
Conklin, John P., Saratoga Springs.
Chittenden, S. B., New York.
Crawford, J. F., Syracuse.
Chamberlin, Olcott A., Richfield Springs.
Crapo, John M., Albany.
Childs, J. Morris, Utica.
Church, Walter S., Albany.
Campbell, John S., New York Mills.
Case, Henry J., Auburn.
Converse, George W., Winchendon, Mass.
Cammann, Herman H., New York.

D.

Delavan, H. W., Ballston.*
Delafield, John, Oakland.*
Dickey, George, New York.*
Dinsmore, William B., Staatsburgh.
Demarest, Abram A., New York.
Defreest, John K., Defreestville.
Draper, Simeon, New York.*
De Witt, Edward, New York.
Dater, Philip, New York.*
Dillon, Robert B., New York.
De Forest, D. W. C., Defreestville.
Dill, John B., Auburn.
Dows, David, New York.
Devereux, John C., Ellicottville.
Dollner, Harold, New York.
Doolittle, Charles H., Utica.
Dagwell, John, Utica.
Dorland, William L., Dean's Corners.
Dickey, Charles D., New York.
De Angeles, W. W., Holland Patent.
Dodge, Henry, Washington Mills.
Downer, Charles, Utica.
Dewey, C. D., Port Leyden.
Dodge, W. E., New York.
Dater, James, New York.
Doelker, George, Albany.

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Dike, Henry A., New York.
Dwight, J. W., Dryden.
Davenport, Charles L., Syracuse.
Dagge, Edward, Rochester.
Dike, James P., New York.
Dennistoun, William, New York.
Dodge, J. P. B., Esopus.
Defreest, Martin D., Defreestville.
Davis, J. C. Bancroft, Newburgh.
Didama, John E., Medina.
Dows, Ammi, Charlton.
Doncaster, Daniel, Albany.
De Long, M. B., Utica.
Douw, Volkert P., Albany.
Diven, Alexander S., Elmira.
Dederick, Peter K., Albany.
Duel, Stephen T., Little Rest.
Doyle, William, Albany.
De Forest, Jacob J., Duanesburgh.

E.

Edmonds, F. W., Bronxville.*
Emmett, Thomas Addis, Astoria.*
Earle, Morris, New York.*
Ellwanger, George, Rochester.
Edwards, Edward, South Corinth.
Erwin, Charles H., Painted Post.
Eddy, John W., ———.
Erwin, E. H., Painted Post.
Elliott, John, New York.
Everett, William E., Rye.
Ellis, Edwin, Albany.
Ely, William M., Binghamton.
Ely, Joseph E., Binghamton.
Ely, Francis, Deansville.
Ellsworth, S. H., Starkville.

F.

Fairbanks, T., St. Johnsbury, Vt.*
Fairbanks, E., St. Johnsbury, Vt.
Fairbanks, H., St. Johnsbury, Vt.
Fellows, Joseph, Bath.
Foster, H. Ten Eyck, Lakeland.*
Finlay, J. Beekman, Saratoga Springs.*
Faile, Edward G., New York.*
Faile, Thomas H., New York.
Faile, Edward, West Farms.*
Faile, Charles V., New York.
Faile, Samuel, White Plains.
Fox, William W., New York.*
Furman, John M., New York.
Faxton, T. S., Utica.
Fox, George S., West Farms.*
Forbes, Paul S., Beaverwyck.
Frost, J. T., Clinton Point.
Ferris, William L., Westchester.
Faile, Henry, New York.
Frame, William, Flushing.*
Faile, Thomas H., Jr., New York.
Fields, P. H., Geneva.
Fitch, Asa, East Greenwich.
Fuller, Dudley B., New York.*
Furguson, Amos, Utica.
Farwell, Samuel, Utica.
Foster, James S., New Hartford.
French, L. L., Page's Corners.
Freer, S. D., Cortlandville.
Freeman, Isaac, Bemis Heights.
Filley, Samuel R., Woodstock.
Ford, Henry A., Westerlo.
Foster, Frederick G., New York.
Foster, Edmund B., West Stockbridge.
Ferris, John, Moresville.
Frothingham, Wm., Washington Heights.
Fitch, Mason P., Elmira.
Fellows, Benjamin, Clifton.
Frazer, Kasson, Syracuse.
French, J. D. W., North Andover, Mass.
Fowler, C. Gilbert, Newburgh.
Fox, Eli, Mohawk.

G.

Geddes, George, Fairmount.
Gauley, William M., New York.*
Goldsmith, R. F., West Southold.
Glenn, W. W., Baltimore, Md.*
Granger, Oscar, Saratoga Springs.*
Gallup, S. M., New York.
Greig, John, Canandaigua.*
Griffin, Elihu, Clinton Corners.*
Green, John C., New York,
Granger, Gideon, Canandaigua.*
Gould, John Stanton, Hudson.
Gillman, Arthur, Lee, Mass.
Geddes, James, Fairmount.
Green, A. H., New York.
Gunn, S. W., Kirkland.
Gilbert, E. M., Utica.
George, Thomas, Newburgh.
Gandy, Shephard, New York.
Galbraith, Thomas, Washington Hollow.
Gibbs, I. E., Watertown.
Greenman, Silas C., Utica.
Gregory, H. C., Unadilla.
Gibbs, R. B., Harpersfield.
Granger, Foster O., Saratoga Springs.
Grumman, Wm., Newark, N. J.
Gordon, Robert, New York
Griswold, John A., Troy.
Gould, Thomas, Aurora.
Goodman, R., Lenox, Mass.
Grice, C. C., New York.
Greenway, John, Syracuse.
Gould, David G., Quaker Hill.
Graham, James H., Delhi.
Gridley, O. B., Deansville.
Goldsmith, Alden, Blooming Grove.
Greer, Thomas H., Albany.
Goold, John C., Albany.

H.

Huntington, Benjamin N., Rome.
Hartshorne, George, Rahway, N. J.
Haviland, I. E., Hempstead Branch.
Haight, Edward, Westchester.
Hunt, Wilson G., New York.
Hopkins, Lucius, New York.
Herrick, John H., New York.

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Harold, John, Hempstead.
Holmes, A. B., New York.
Hastings, George F., Shushan.
Hoadley, Luther, Harwinton, Conn.
Hayward, E. S., Rochester.
Hurst, William, Albany.
Hall, Peleg, New York.
Hoe, Richard M., New York.
Hurlbut, H. A., New York.
Hamilton, D., Watervliet.*
Herrick, E. H., New York.*
Haven, John, New York.
Herrick, Jacob B., New York.*
Howell, Benjamin H., New York.
Hoe, Peter S., New York.
Hilton, Joseph, New Scotland.
Hopkins, Henry, New York.*
Houpt, Henry H., Dryden.
Hungerford, Solon D., Adams.
Huestis, Hugh, Adams.*
Hovey, C. M., Boston.
Hayes, Clark I., Unadilla.
Harison, Thomas L. Morley.
Harison, Richard M., New York.
Harison, George D. L., New York.
Harison, Francis, New York.
Howland, Obadiah, Auburn.
Harberger, J. S., New York.
Hopkins, O., New York.
Heyne, Carl, Red Hook.
Huntington, E., Rome.
Hart, H. R., Utica.
Hawley, J. S., Binghamton.
Hallett, J. S., New York.
Hager, John G., Rhinebeck.
Houghton, W. J., ———.
Harder, M., Cobleskill.
Hoyt, D. C., ———.
Hendrick, James, Albany.
Harris, Joseph, Rochester.
Herring, Silas C., New York.
Hoyt, Alfred M., New York.
Hicks, B. D., North Hempstead.
Hatch, Lewis M., Ashville, N. C.
Hoge, William, Tarrytown.
Holmes, Wm. M., Greenwich.
Hess, Elmon, West Somerset.
Hubbell, Alrick, Utica.
Hunt, Ward, Utica.
Hopkins, W. R., Utica.
Howland, Joseph, Matteawan.
Heffron, D. S., Utica.
Holden, E. C., McGrawville.
Hodge, John, Lockport.
Hubbell, Eli S., Elmira.
Holmes, H. C., Quaker Springs.
Hamilton, William, Westmoreland.
Hay, A. B., Troy.
Hutchinson, C. W., Utica.
Hooker, Horace M., Cooperstown.
Husted, James W., Peekskill.
Hexamer, Frederick M., New Castle.
Herrick, Jonathan R., Albany.
Hilton, William J., Albany.
Hart, William Howard, Troy.
Hagan, William E., Troy.
Hand, Thomas J., Sing Sing.

I.

Isham, W. B., New York.*
Irvin, Richard, New York.
Ives, Julius, Jr., New York.
Ives, Julius, New York.
Ingalsbe, H. H., South Hartford.
Ingalsbe, Milo, South Hartford.
Ingalsbe, James L., South Hartford.
Irwin, D. B., Middletown.
Ibbard, Charles, Sprout Brook.

J.

Johnson, B. P., Albany.*
Jones, Edward, Rhinebeck.
Jackson, John C., New York.
Johnson, Samuel Wm., Ellicottville.
Johnston, James Boorman, New York.
Johnston, William S., Poughkeepsie.
Jay, John, Katonah.
Jones, O. W., New York.
Johnson, William, Geneva.*
Johnson, Bradish, New York.
Johnson, R. L., Albany.
Jervis, John B., Rome.
Jones, David R. Floyd, S. Oyster Bay.*
Johnston, John T., New York.
Jones, Morris R., Rome.
Juliand, Joseph, Bainbridge.
Judd, Orange, New York.
Jewell, A. L., Waltham, Mass.
Jaffray, Edward S., New York.
Johnson, Benj. W., Albany.
Jackson, George P., Albany.

K.

Kelly, William, Rhinebeck.*
King, John A., Jamaica.*
Keene, Stephen S., New York.*
Kirtland, B. B., Greenbush.*
Kennedy, Robert L., New York.
Ketchum, Morris, New York.
Keese, Samuel T., New York.
Kidder, K. P., Burlington, Vt.
Kelly, Henry, New York.*
King, John A., Jr., Great Neck.
Kelly, William, Jr., New York.
Kellogg, P. V., Utica.
King, R. V., New York.
Kirke, George Wistar, New York.
Kingsland, Thos. B., New York.
Keays, Edward, Albany.
Kirby, William A., Auburn.

L.

Leray de Chaumont, James, Leraysville.*
Lenox, James, New York.
Livermore, Charles F., New York.
Lee, John R., Buffalo.
Ludlow, William H., Sayville.
Lincklaen, Ledyard, Cazenovia.*
Lawrence, Edward A., Flushing.
Leggett, Edward W., Harlem.*

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Lockwood, E., New York.*
Landon, William, Albany.*
Lee, William H., New York.
Leavitt, Henry S., New York.
Lockwood, George, New York.*
Leland, Simeon, New York.
Lawrence, F. N., Flushing.
Leonard, Moses G., Rockland Lake.
Lexow, Rudolph, Nanuet.
Livingston, E. P., Clermont.*
Lawrence, L. H., Utica.
Lawyer, Luther, Perth River.
Lowber, R. W., New York.
Lay, F. W., Greece.
Leverich, C. P., New York.
Lambert, W. G., Jr., Chappaqua.
Lord, J. Cooper, New York.*
Lee, David B., New York.
Lorillard, L. L., West Farms.
Look, S. J., Clayville.
Lyman, David, Middlefield, Conn.
Lord, H. G., ———.
Leland, W. W., Saratoga Springs.
Leland, C. E., Saratoga Springs.
Loomis, H. B., New York.
Lawrence, De Witt C., New York.
Lewis, Harris, Frankfort.
Leverich, Charles D., Newtown.
Lee, William, Schenectady.
Lane, George W., New York.
Livingston, Robert J., New York.
Littlefield, R. M., Afton.
Lansing, Charles, Lansingburgh.
Liautard, A. F., New York.
Leach, Alman, Utica.
Livingston, Hiram, Albany.
Lathrop, Ariel, Albany.

M.

McIntyre, J. McDonald, Linlithgow.
Marvin, James M., Saratoga Springs.
Morris, Lewis G., Mt. Fordham.
McIntyre, Archibald, Albany.*
Maitland, William C., Fordham.
McGraw, Joseph, Dryden.
Murray, George, New York.
Morris, Fordham, Mt. Fordham.
Morris, Francis, Mt. Fordham.
Munn, Samuel, Mott Haven.
Miller, James M., New York.
Miller, Daniel S., New York.
McGraw, John, Ithaca.
Mortimer, John H., New York.
Marks, Enos, Camillus.
Mather, F. E., New York.
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Maxwell, Hugh, New York.
McCredy, Dennis A., New York.*
Moore, D. D. T., New York.
Mauran, S. E., White Lake.
Mitchell, O. M., Saratoga Springs.*
Masterton, Alexander, Bronxville.
Munroe, Allen, Syracuse.
Maxon, Thomas V., Adams.
McCall, James S., Geneva.
Morss, B. G., Red Falls.
Morrison, James M., New York.
Matteson, James M., Jacksonville.
Morgan, J. E., Deerfield.
Middleton, R., Utica.
Mason, D. C., New Hartford.
Mecke, J. A., New York.
Maitland, R. L., New York.*
Mason, J. W., Brooklyn.
Moller, W. F., Irvington.
Mesick, P., Albany.
Matthewson, Park, Williamsport, Pa.
Messenger, W. S., Great Neck.
Minturn, Robert B., New York.
Matteson, O. B., Utica.
Millard, S. A., Clayville.
Mason, S. M., New Hartford.
Mann, J. F., Utica.
Melick, William B., Albany.
Matthewson, J. E., New Berlin Centre.
Munson, E., Tyre.
Merriam, Charles M., Leyden.
Mowry, J. F., Deansville.
Moffatt, John N., New York.
Miller, Seth, Constableville.*
Merriam, C. L., Leyden.
Morrell, Robert, Manhassett.
Mitchell, Samuel L., New York.
Moon, C. B., Saratoga Springs.
Myers, John K., Yonkers.
Myers, Marvin E., Charlton.
Musselman, Chauncey, Phelps.
Mills, M. H., Rochester.
McNeil, R. C., Campville.
Mount, Andrew, New York.
Miller, Peter, Fredonia.
Martin, William R., New York.
Macomb, John Navarre, Jr., Branchport.
Merchant, Abel, Nassau.
McCarthy, Patrick, Albany.
Mixter, David E., Jordanville.
McGraw, Thomas, Albany.
Mills, George F., Fonda.
Miller, Brayton B., Leyden.

N.

Norton, Robert, New York.
Nourse, J., Boston, Mass.
Nellis, A. J., Bath.
Nusbaum, Israel, Albany.
Nelson, George P., Scarsdale.
Newton, William, Henrietta.
Norman, Thomas E., Albany.

O.

Odell, William, T., Ballston Spa.
Otis, H. G., Geneva.
Osgood, Jason C., Troy.
Olmsted, H. M., Morristown, N. J.
Osborn, Amos O., Waterville.
Ostrander, W. P., Schuylerville.
Owen, Jesse, Chemung.

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Ogden, Gouverneur M., New York.
Osborne, David M., Auburn.
Osborne, John H., Auburn.
O'Brien, B., Albany.

P.

Patrick, M. R., Manlius.
Prentice, Ezra P., Albany.
Plumb, Josiah B., Albany.
Phelps, Thomas W., New York.
Peet, Harvey, P., New York.*
Pease, R. H., New York.
Post, William, New York.*
Paton, Thomas, New York.
Phelps, Peter, Derby, Ct.
Phelps, Royal, New York.
Popham, Wm. H., Scarsdale.
Pinkney, Thomas, Bronxville.
Pell, Robert L., Pelham Farm.
Punnett, James, New York.*
Pye, Edward, Haverstraw.*
Pumpelly, Harman, Albany.
Peck, Edgar F., Brooklyn.
Peters, T. C., Darien.
Pierson, Henry L., New York.
Pyle, James, New York.
Pratt, Zadock, Prattsville.*
Park, Joseph, New York.
Palmer, Allen B., Geneva.
Penfold, E., New York.*
Park, H. S., New York.
Pine, G. W., Herkimer.
Priest, Z. C., Utica.
Priest, D. E., Utica.
Palmer, J. L., Adams Centre.
Pine, Ai, Pittstown.
Pomroy, William H., New York.
Peugnet, Charles, Cape Vincent.
Palmer, N., Hudson.
Palmer, T. G., Hudson.
Page, J. R., Sennett.
Penfold, E., New York.
Prentiss, J. H., Utica.
Palmer, A. W., Amenia.
Potter, Howard, New York.
Pearsall, N. B., Morris.
Purdy, Samuel M., West Farms.
Paton, William, New York.
Peet, Isaac Lewis, New York.
Pinckney, Stephen R., New York.
Penfold, William Hall, New York.
Peebles, W. A., Martinsburgh.
Potter, Lewis, Easton.
Pratt, Robert W., Fort Edward.
Perkins, T. E., Providence, R. I.
Palmer, A. S., Albany.
Prescott, T. A., Sandy Hill.

R.

Rust, Philo N., Syracuse.*
Rotch, Francis, Morris.
Robinson, Henry, Newburgh.
Richardson, Thomas, Westchester.*
Reed, Almet, New York.
Rogers, Henry W., Buffalo.
Rathbun, L. W., Springfield.
Rotch, Francis M., Morris.*
Randall, Nathan, Syracuse.
Robbins, George A., New York.
Rutherford, Thomas H., East Chester
Read, J. Meredith, Albany.
Randall, Benjamin, Adams.
Read, William G., New York.
Robinson, Charles, Fishkill Plains.
Reynolds, M. F., Rochester.*
Rockwell, S. D., New York.
Read, J. H., Utica.
Randall, H. S., Cortland.
Rankin, W., Charlotte.
Richards, D. C., Fort Washington.
Rogers, D. E., Wheatland.
Rowe, J., Poughkeepsie.
Riggs, C. G., Turin.
Ramsdell, L., Greeneville.
Randall, N. W., Bristol Centre.
Reeve, J. H., Wells Corners.
Ripley, Joseph, New York.
Rider, Zerah, Cambridge.
Root, Samuel, Westport.
Ronan, Patrick, Elmira.
Remington, M. C., Weedsport.
Rathbone, George, New London.
Ramsdell, Homer, Newburgh.
Rose, David, Albany.

S.

Saxton, C. M., New York.
Seward, William H., Auburn.
Seymour, Horatio, Utica.
Sherwood, John M., Phelps.*
Stetson, Charles A., New York.
Spencer, Lorillard, Westchester.
Spinner, John D., Herkimer.
Stevens, E. R., Saratoga Springs.
Sheafe, J. F., Dutchess.
Smith, N. Everett, New York.
Sherman, Benj. B., New York.
Smith, D. D., New York.
Sherman, C. A., New York.
Sherman, B. L., New York.
Spaulding, Henry F., New York.
Swan, Robert J., Rose Hill.
Southworth, John Ellis, New York.*
Stuart, Robert L., New York.
Stuart, Alexander, New York.
Sloane, Samuel, New York.
Sheldon, James O., Geneva.
Suydam, Henry, Jr., New York.*
Sands, A. B., New York.*
Smith, Silas G., Mechanicville.
Smith, M. M., Lowville.
Swan, Benjamin L., Oyster Bay.
Slingerland, William H., Normanskill.
Schenck, William J., New York.
Smull, Thomas, New York.*
Southworth, John, Dryden.
Seney, George J., New York.
Spofford, Paul, New York.*
Shark, Anthony, Defreestville.

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Sheldon, Lucius M., Geneva.
Swain, James P., Bronxville.
Simpson, William, West Farms.
Strong, Benjamin W., Newtown.
Simpson, John V., West Farms.
Sherill, Eliakim, Geneva. *
Standring, L. S., Deer River.
Saunders, Thomas P., Adams.
Simpson, William, Jr., West Farms.
Sherwood, Frederick, New York.
Smith, Albert, New Rochelle.
Sisson, G. M., Genoa.
Sherrill, Lewis, Greenville.
Sheldon, H. K., New York.
Sampson, G. G., Brooklyn. *
Sutherland, J. H., Pittsford.
Shonnard, E. F., Yonkers.
Sherman, S., Lundy's Lane, Pa.
Simpson, ——, White Plains. *
Seaman, P., Newburgh.
Sherman, Ira E., Sidney Plains.
Swan, William H., New York.
Stephenson, G. S., New York.
Southworth, ——, Utica. *
Savage, Thomas, New Hartford.
Spriggs, J. T., Utica.
Spencer, J. E., Utica.
Sweezy, George W., New York.
Schuyler, Peter C., New York.
Seeley, D. W., Albany.
Sheldon, James, Geneva.
Swain, Thomas M., Bronxville.
Stillman, Charles, Woodstock.
Sturges, Jonathan, New York.
Schoonmaker, Henry, Cedar Hill.
Sherman, W. C. H., Newburgh.
Sharp, Jacob, Rome.
Safford, Halsey, East Otto.
Staley, Daniel G., Albany.
Sandford, Charles, New York.
Schreiner, O. H., New York.
Scott, John H., New York.
Stockwell, S. S., New York.
Stevens, S. W., Rochester.
Selkreg, J. H., Ithaca.
Schultz, Jackson S., New York.
Simpson, J. B., Jr., New York.
Smith, Solomon P., Waterford.
Shattuck, Lewis H., Westmoreland.
Sherrill, E., New Hartford.
Shaw, George, Deerfield.
Sanford, George H., Schenectady.
Smith, J. Wesley, Albany.
Spofford, Joseph L., New York.
Shaw, Patrick H., Albany.
Sturtevant, E. L., South Framingham, Mass.
Stoddard, Joshua C., Lockport.

T.

Thompson, Samuel L., Setauket.
Tucker, Luther, Albany.
Thorne, Jonathan, New York.
Thorne, Edwin, New York.
Thorne, Samuel, Thorndale.
Titus, James H., Malone.
Taber, Samuel T., Roslyn. *
Tomes, Francis, Jr., New York.
Thayer, Adin, Jr., Hoosick Falls.
Thompson, James, Ballston Spa.
Tappan, John L., New York.
Toole, William S., New York.
Terry, Edmund, Utica.
Thorne, Stephen, Utica. *
Tripp, Lemon B., North Castle.
Thomas, Herman, Saratoga Springs.
Thomas, John, Frankfort.
Ten Broeck, W. S., Rhinebeck.
Tweed, Wm. M., New York.
Tucker, Luther H., Albany.
Toby, Silas W., Hudson.
Toby, Arthur, Pittsford.
Taylor, John W., ——
Townsend, John, Albany. *
Thompson, Frederick, New York.
Tweddle, George, Albany.
Taylor, E. M., Elmira.
Titus, Charles M., Ithaca.
Tibbetts, Lester G., New Scotland.

U.

Upham, A. S., Le Roy.
Underhill, Daniel, Jericho.
Underhill, Richard T., Croton Point.*
Underwood, G. F., ——

V.

Vail, George, Troy.
Van Rensselaer, Gen. Stephen, Albany. *
Van Rensselaer, Stephen, Jr., Albany. *
Van Rensselaer, William P., Albany.
Van Pelt, Henry, New York. *
Van Rensselaer, R. H., Morris.
Van Antwerp, John, West Farms.
Van Alstyne, P. Edward, Kinderhook.
Van Wie, Peter, Cedar Hill.
Van Horn, G. H. F., Fonda.
Van Buren, W. H., New York.
Van Deusen, H. A., Sprout Brook.
Van Hoesen, John I., Castleton.
Van Benthuysen, Charles, Albany.
Van Benthuysen, Charles H., Albany.
Van Benthuysen, Arthur L., Albany.
Vick, James, Rochester.

W.

Wadsworth, James, Geneseo. *
Wadsworth, James S., Geneseo. *
Wadsworth, William W., Geneseo. *
Wells, Edward, Johnstown.
White, Hollis, Niagara Falls.
Ward, John, New York. *
Wells, Henry, Aurora.
Watson, William, West Farms.
Wainwright, C. S., Rhinebeck.
Wolfe, John David, New York.
Wykoff, S. S., New York.

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Whitlock, Benjamin M., West Farms *
Willetts, Robert, Bayside.
Wetmore, Prosper M., New York.
Wilkin, J. W., Goshen.
Weed, William H., New York.
Wilson, Catlin, Eutaw, Alabama.
Weston, Frederick, Sandy Hill.
Wendell, Herman, Albany.
Weed, W. W., Buffalo. *
White, William M., Canaseraga.
Woodworth, Augustus P., New York.
Whitney, Orla H., Mexico. *
Walbridge, D. T., Rochester.
White, Hugh, Waterford. *
Willard, G. L., Cold Spring.
Wight, R. A., Albany.
Williams, J. B., Ithaca.
White, Rufus P , Adams.
Wood, Amos F., Woodville.
Ward, F. B., Le Roy.
Wolfe, N. H., New York.
Warner, Horatio G., Rochester.
Wende, Herman, Alden.
Wende, B. A., Alden.
Wood, Orren S., Montreal.
Winne, Jurian, Bethlehem.
Williams, J. E., New York.
Wackerhagen, E., Albany.
Wetmore, Benjamin C., New York.
Wadsworth, Craig W., Geneseo.*
Williams, S. L., Perrinton.
Whitney, George J., Rochester.
Wilcox, A. T., Fayetteville.
Wheeler, G. H., Hammondsport.
Wilbur, R. P., Lowville.
Woodford, F. T., Utica.
Walrath, Solomon, Rensselaer Falls.
Willetts, Samuel, New York.
Walcott, W. D., New York Mills.
Wilson, Charles S., Utica.
Wood, E. D., Utica.
Wolcott, S. G., Utica.
Willard, X. A., Little Falls.
Watson, H. M., Buffalo.
Wier, Henry, Johnsonville.
Wing, John D., Dutchess.
Wade, Elias, Jr., New York.
Watts, John, Ithaca.
Wood, W. Anson, Hoosick Falls.
Wells, Eugene, Rhinebeck.
Warner, Daniel D., Canaan.
Wendell, Charles, Albany.
Wier, H. C., Sugar Loaf.
Wadsworth, James W., Geneseo.
Wendell, E. A., Albany.
Wood, John E., Middleton.
Watson, W. H., Medina.
Warner, George H., New York Mills.
Welles, John C., Athens, Pa.
Willers, Diedrich, Jr., Varick.
Wilson, James H., Whitesboro.
Wood, Frank, Hoosick Falls.
Wood, Almon H., Utica.
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STATE OF NEW YORK.

No. 103.

IN ASSEMBLY,

March 31, 1871.

TRANSACTIONS

OF THE

NEW YORK STATE AGRICULTURAL SOCIETY.

STATE AGRICULTURAL ROOMS,
ALBANY, *March* 30, 1871.

To the Hon. WILLIAM HITCHMAN,

Speaker of the Assembly:

SIR.—I herewith transmit to the Legislature, the thirtieth annual report of the New York State Agricultural Society, with the accompanying abstracts and documents.

Yours very respectfully,

T. L. HARISON,

Secretary.

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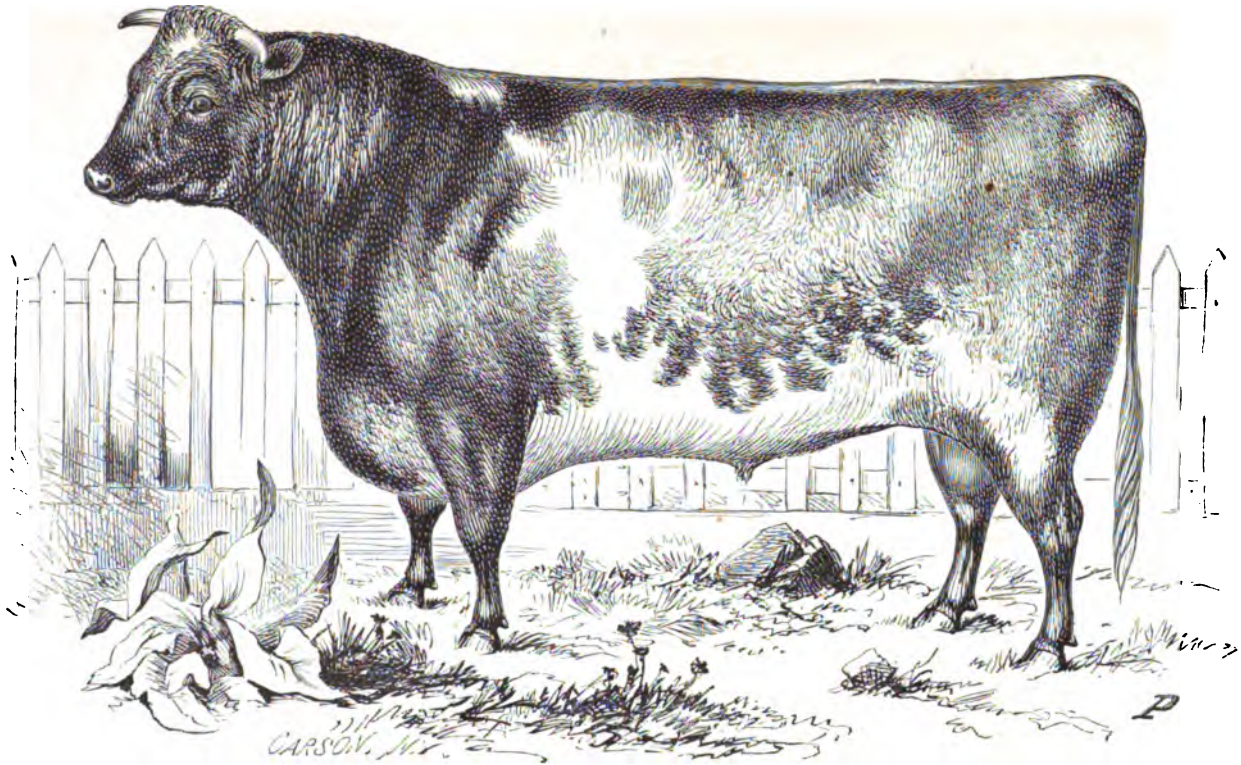

ROYAL BRITON, 9014.

Bred by T. C. Booth, Warlaby, England; imported by Walcott & Campbell; since sold to Charles E. Coffin, Muirkirk, Md.; winner of the first prize, in the class of two-year old Short Horn Bulls, at the State Fair at Utica, 1870.

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TRANSACTIONS

OF THE

New York State Agricultural Society.

REPORT OF THE EXECUTIVE COMMITTEE.

To the Honorable the Legislature of the State of New York:

The Executive Committee of the New York State Agricultural Society respectfully report that the season of 1870 has, in the greater part of the State of New York, been remarkable for the extreme heat of the summer, and, in a greater degree, for the unusually scant rainfall and long-continued drought. As a consequence the yield of all the cereals has been more or less diminished; wheat least, barley and oats the most. The crop of Indian corn was of unusually good quality, having matured very early; that of potatoes was light; and fruit of all kinds gave an abundant yield. The prices of grain have been low, owing to the low range of prices in all European markets, which, together with our home markets, have been influenced by the large crops of wheat, barley and corn in the western States. The dairy interest has suffered greatly, the character of the season having very materially reduced production, while prices have been rather lower than were obtained for the large product of 1869. The year 1870 has, however, passed more lightly over the farmer than the merchant, the manufacturer and the artisan, and they have abundant reason to be grateful who have not felt the dire effects of the dullnes of business and depreciation of values that have prevailed since our last annual meeting.

The operations of the Society during the year have been restricted to its usual routine of labor. Shortly after the annual meeting the arrangements were completed with a committee of citizens of Utica for holding the fair at that place, and it was also decided to try the experiment of judging the implements and machines entered for

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prizes during the fortnight before the fair. The reason for this action will be obvious to all who have attended the recent State fairs and seen the difficulty of judging implements at all, and the impossibility of doing it deliberately, in the bustle, crowd and confusion of the fair days. In fact, there were only three ways of meeting the difficulty: by having so large a number of judges that each committee should have but a few hours' work; by judging and testing the implements before the opening of the fair; or, finally, by giving no prizes for implements, and thus obviating the necessity of any judging. The first expedient was utterly impracticable, because the large number of judges required could hardly be found and assembled at the fair. It requires a good deal of inquiry and deliberation to select half a dozen men fit for the duty of deciding upon the comparative merits of such perfect implements as we now have, and this plan would have required half a hundred. The last of the three expedients, it was thought, would have, sooner or later, to be resorted to; and though an exhibition of implements and machinery, without competition for prizes, is neither without advantage to the manufacturer, nor uninstructive to the public, it is not satisfactory to a large class of exhibitors, including all who have implements of new design or invention; while it affords no opportunity of gaining the deliberate opinion of experts to guide the farmer in his selection, nor of encouraging and rewarding ingenuity in contrivance and faithfulness in workmanship by special public notice and honorable awards.

Upon such considerations the conclusion of the Executive Committee was based, and the citizens of Utica coming forward with great liberality in aid of the Society, it was arranged to have the trial of implements at the same place with the fair, and circulars were issued to all former exhibitors and to all the manufacturers that could be reached; and, although the attendance was not so large as was expected, there was still as much work as the judges could do in the time allotted, and the result is considered extremely satisfactory, especially to the exhibitors in this department.

The expense and labor attending this plan are, however, too serious to allow of it being carried out every year, and it would seem to be the policy of the Society to hold, this season, a trial of harvesting implements, which have had no trial under the direction of this Society since 1866, and afterward to offer no prizes in this department until 1873 or 1874, when a trial similar to that of last year could be had, to be followed in like manner by a trial of harvesting implements the next summer.

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The fair at Utica was in all respects a satisfactory one. The show of cattle was quite full; the Short-horn class, of high average merit, and including some animals, recently imported, that had won honors in England; the Devons, unusually numerous and good; the Ayrshires and Jerseys fully up to the average; and there was a remarkably good ring of fat oxen and steers. Horses, in the class of breeding and growing stock, were stronger than usual in numbers and merit, but weaker than in some former years in the harness class. The new gold medal prize, for stallions accompanied by six of their produce, brought out a good entry, Mr. Thorne's Hamlet taking the prize, and Mr. Bacon's Ethan Allen, whose offspring showed both strength and symmetry, being a good second. The classes of sheep, swine and poultry, particularly the last, were well filled. The implement department was well sustained, as the judges' reports will show; no less than sixty-three bronze medals, which are given only for articles of high value and merit, having been awarded. The department of farm produce was rather meagerly filled, notwithstanding the large increase within a few years in the amount of money given in premiums; but in no other are the exhibitors more intelligent or more interested, and it should be an object of great solicitude and earnest effort to make this department worthy the labor and expense bestowed upon it. If this cannot be done, the question is, whether the State fairs may not better be made great shows of live stock and implements only, leaving the exhibition of grain and other produce to the local societies.

The arrangements for the fair, with the exception of the water supply, were generally very satisfactory, and the new buildings, especially the large one with trussed rafters and shingled roof, used one-half for the domestic goods and miscellaneous entries, and the other half for fruits and flowers, was the best ever put up for the Society.

The reports of the county and town societies and farmers' clubs, so far as received, show general prosperity.

There have been larger additions than usual to the library of the Society during the past year, both by purchase and by donations and exchanges; and the Society is under obligations to several of its members for donations of old volumes of the Transactions, whereby sets have been completed and the Executive Committee have been enabled to supply the libraries of other institutions and societies. The donation by the Hon. Erastus Corning of nine copies of the very rare volumes of 1841 and 1842 is especially to be acknowledged.

The finances of the Society are in a satisfactory condition, although any great addition to the reserve fund is prevented by the large

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increase in the premium list and the expense attending the implement trial, notwithstanding the liberality of the citizens of Utica, who contributed toward it $1,000 and all the material needed for showing the machines in operation.

The consideration of the arguments put forth in the report of last year has resulted in a stronger and more general conviction of the necessity of permanent grounds and buildings for the State fairs, and the Executive Committee decided, in December last, to submit to the members and friends of the Society throughout the State, a proposition matured by several of its members, and believed to present the only plan by which we can accomplish the end desired, viz.: The adoption of the rotatory system, with permanent buildings at several places in the State. This proposition, it is true, looks primarily to obtaining one fair ground only, but the inevitable effect will be that other cities, beside that successful in the first competition, will, one after another, offer similar accommodations. Until this happens, the Society may accept invitations for every year for which it is not bound to hold the fair at any fixed place. The plan has been generally approved, and a bill is now before the committee on agriculture of the assembly for an appropriation of $50,000 for permanent buildings, to be paid to the Society whenever the ground shall be given and accepted.

The epizootic, known as the foot and mouth disease, or *epizootic aphtha*, has this year been imported into America for the first time. It first appeared in the United States in Oneida county (in New York), in October last, but does not appear to have spread in, nor is it known how it was conveyed to that county, and it is believed to have been extirpated. In November, however, it broke out in Dutchess county, and became quite widely spread. It has since been found in some of the Long Island dairies. The State cattle commissioners took prompt measures to the extent of their powers under the present law, and it is hoped that serious mischief will be prevented. The Society employed the consulting veterinarian, Professor Law, of Cornell University, to visit the infected district in Dutchess county, to bring the highest available veterinary skill to the aid of the State commissioners. Professor Law extended his visit to other infected districts in Connecticut and Massachusetts, and made a report upon the subject, which has been published in the Society's monthly journal. The disease is prevailing, to a considerable extent, in Maine also; but in all the States in which it has appeared, steps have been taken to prevent its spread, and it is hoped with success. The disease is an

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annoying one, and, though seldom fatal, causes very serious loss, especially in dairy districts. The present cattle law expires during the present session of the Legislature, and the importance of the continuance of a systematic organization, like the present commission, for the protection of our flocks and herds from the ravages of infectious diseases, can hardly be over estimated. The subject was mentioned, in terms that showed a just appreciation of its gravity, by the Governor in his recent message to the Legislature, and a bill has been prepared by a committee of the Society, acting in concert with the State cattle commissioners for the re-enactment of the old law, amending it so as to supply a few defects, and providing for the expense of enforcing its provisions. Nothing but the existence of the State commission, and the prompt measures taken under the old rinderpest act, saved our herds from terrible havoc by Texas fever, in 1868; and if the foot and mouth disease should not be extirpated, and should become, as it inevitably would, but for the precautionary measures promptly taken, general throughout the State, the losses, even by this *comparatively mild* disease, would soon be counted by millions of dollars. The wealth of the State of New York consists largely in its flocks and herds, and our agriculture is tending, year by year, more and more in this direction. The enactment of proper regulations for preventing the introduction and spread of disease, is, therefore, essential as an economic measure, to say nothing of its importance in a sanitary point of view; and to defray the cost, which never can be serious, and in most years will be trifling, of enforcing these regulations, is as wise and as necessary an expenditure of public money as any that can be imagined.

The Executive Committee has to record the death, in the month of September last, of Oscar Granger, of Saratoga. Mr. Granger was one of the most useful and valued members of the Society, and had several times served as a member of the executive board. His industry and intelligence made him highly successful as a farmer, and his example, especially in the formation and management of his dairy farm, was a most valuable aid to the advancement of the agriculture of his county.

The death of Mr. Samuel T. Taber, the vice-president from the second district, and associated for a long period with the present active membership of the Society, was communicated to his colleagues but yesterday. This loss is so heavy and so sudden, that they can at this time do no more than announce the event, reserving for another occasion the payment of a fitting tribute to his memory.

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ANNUAL MEETING, 1871.

The New York State Agricultural Society met in the Assembly Chamber on Wednesday, the 8th day of February, 1871, at noon. Mr. Hungerford, the President of the Society, being absent, on account of illness, the Honorable B. F. Angel, of Geneseo, presided.

The report of the Executive Committee was read by the Corresponding Secretary, and, on motion of Ex-President Conger, the same was accepted.

The Treasurer presented and read his report for the past year, as passed by the auditing committee, showing the receipts and expenditures since his last report; and, on motion of Ex-President Morris, the same was accepted.

On motion of Ex-President Kelly, the usual committee of three members from each judicial district was ordered, for the purpose of nominating officers for the ensuing year, and to recommend, if they should see fit, the place for holding the annual fair.

And the following members were, on the nomination of the members present from the several judicial districts, constituted such committee:

First District—Thomas H. Faile, Lewis G. Morris, Samuel Thorne. Second—William Kelly, A. B. Conger, Edwin Thorne. Third—Walter S. Church, Adin Thayer, Jr., John Stanton Gould. Fourth—W. T. Odell, I. V. Baker, Jr., Chauncey Boughton. Fifth—S. S. Whitman, J. M. Childs, James Geddes. Sixth—W. H. Bristol, John Banks, W. M. Ely. Seventh—James O. Sheldon, Anson S. Wood, Volney P. Brown. Eighth—Lewis F. Allen, Allen D. Scott, H. Bowen.

The committee then retired for deliberation.

Notice was given by Mr. O. B. Gridley, of Oneida county, that at the next annual meeting of the Society it will be proposed to amend the constitution, by changing the time for holding the annual meetting to the first Wednesday in January, or such other day as may then be decided upon, instead of the second Wednesday in February.

On motion of Ex-President Patrick, Miss Midy Morgan, agricul-

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tural editor of the New York Times, was invited to read a paper before the Society on the ill-treatment of cattle in transportation, and on the subject of reformatory schools.

Miss Morgan addressed the Society as follows:

Mr. President and Gentlemen.—In permitting me to speak before you, you do me an honor. In inviting me to address you, you make me a graceful compliment for which I am duly obliged. In my duplicate capacity of agricultural editor and live stock reporter for the New York Times, I see hourly before me two great phases of agricultural necessity, want of skilled agricultural help, and want of rapid transit for agricultural produce. Indeed, I may add a third great need, the want of convenient marts in and close to New York city, for the sale of live stock, as also for the sale of butcher's meats and of all garden produce. During the past year over 3,000,000 head of live stock, including horned cattle, sheep and swine, were sold in the following marts: One Hundredth street, Communipaw, Weehawken, Chamberlin's yards, Forty-eighth street and Fortieth street markets. One and all of these yards are more or less badly constructed; they are too hot in summer and too exposed to severe weather in winter. From these causes the animals in them lose weight, and thereby lose value. The cattle transit of this country is a thing to wonder at; cattle trains never arrive on time; the animals often die and always become much deteriorated from being kept too long on the cars without food or drink, or rest, and in hot weather often become crazed before they reach their destination. To me it seems that the moment has come when it would pay the farmer better to slaughter his cattle at Abilene or Chicago, and forward them for the cool months of the year in properly constructed cars, than to be subject to the losses entailed by the present ruinous system; and in hot weather improved cattle cars and rapid transit by night should be resorted to. The best manner to meet the want of skilled farm help, is to establish reformatory schools, where vagrant children should find a comfortable home and a course of agricultural education. All large cities overflow with a surplus, and consequently dangerous population. On reliable information, I am led to believe that it costs in a general way $2,000 to hang an adult felon. Now, I think it would be wiser to spend a like sum in educating infant vagrants, who, if not so cared for, may become objects fit for the exercise of the hangman's craft.

In relieving cities of wandering children a double benefit is secured; taxation is lowered and the farmer is facilitated. Such an agricultural reformatory school as I would inaugurate, under the auspices of this

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Society, should embrace many departments, at the head of each of which should stand a competent working man; and as I consider that it is especially woman's province to create domestic happiness, I am desirous to be the matron of this rural home.

I am no legislator, but I trust I am a law-abiding woman. To me it matters not whether a man dies worth $5,000 or worth $100,000, so that he has spent a useful, valuable life. Better does it appear to me to own stock on the boundless prairies, to own flocks and herds, than to own stocks in Wall street. There is to me a woful love of city excitement in young Americans; therefore any system that would turn the current of youthful life into the free and pure channels of agricultural pursuits would in itself be a blessing to society at large. If this Society can aid me in this matter I shall hope to give back to the world many useful citizens, saved, so to speak, from moral loss and human degradation. Gentlemen, I thank you for your polite attention.

Mr. Frank D. Curtis, of Saratoga, offered the following resolution:

Resolved, That it is the sense of the State Agricultural Society that vagrant children and juvenile criminals may better be cared for upon reformatory farms, so that they may be fitted for rural labor and for household domestic service than in asylums on the present system.

On motion of Mr. John R. Garretsee, of Monroe, the following was substituted for the original resolution:

Resolved, That this Society approve of the plan of a reformatory farm, on which children (boys and girls) shall be taught the principles and practice of agriculture, and of domestic economy as best exemplified in good housekeeping, and do most heartily endorse the sentiments of the paper read by Miss Morgan.

And the resolution was then laid upon the table for further consideration.

On motion of Mr. Curtis it was

Resolved, That the Society approve of the existing law for the prevention of cruelty to animals, and hope that the same may not be repealed.

The nominating committee reported by their chairman, the Hon. William Kelly, the following list of officers:

President—Richard Church, of Allegany.

Vice-Presidents—First District, Thomas H. Faile, Jr., of New York; Second, Edwin Thorne, of Dutchess; Third, Jurian Winne, of Albany; Fourth, Frank D. Curtis, of Saratoga; Fifth, James

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Geddes, of Onondaga; Sixth, William M. Ely, of Broome; Seventh, Benjamin F. Angel, of Livingston; Eighth, Horace S. Huntley, of Cattaraugus.

Corresponding Secretary—Thomas L. Harison, of St. Lawrence.

Recording Secretary—William H. Bogart, of Cayuga.

Treasurer—Luther H. Tucker, of Albany.

Executive Committee—Adin Thayer, Jr., of Rensselaer; Milo Ingalsbe, of Washington; Fordham Morris, of Westchester; Robert J. Swan, of Seneca; Harris Lewis, of Herkimer; George H. Brown, of Dutchess; Joseph Juliand of Chenango; John L. Cole, of Wayne.

And recommended that the selection of a place for the next State fair be referred to the Executive Committee; which report was accepted, and, a ballot being had, the officers nominated by the said committee were declared duly elected.

EVENING MEETING.

The Society re-assembled in the Assembly Chamber at half-past seven o'clock.

An address was delivered by John R. Dodge, Esq., of the Department of Agriculture, on Sheep Husbandry.

On motion of Ex-President Gould, the thanks of the Society were voted to Mr. Dodge, and a copy of his address requested for publication.

James Law, Esq., member of the Royal Veterinary College of England, Professor of Veterinary Science in Cornell University, and Consulting Veterinarian to the Society, delivered a lecture on the principles of the breeding of animals; and, on motion, the thanks of the Society were tendered Professor Law, and a copy of the lecture was requested for publication.

THURSDAY, *February* 9.

The Society convened in the lecture room at 10:30 A. M., President Church presiding.

The report of Mr. J. B. Lyman, of New York, chairman of the committee on the subject of Marketing Farm Produce, was presented and read, and a paper was read by Mr. Frank D. Curtis on Farmers' Homes.

The Society then adjourned.

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REPORTS OF COMMITTEES AND PREMIUMS AWARDED AT WINTER EXHIBITION, FEBRUARY 9, 1871.

REPORTS OF COMMITTEES.

Field Crops.

John Stryker, Rome, Oneida county, exhibited sample of a crop of corn grown upon five acres of land. Expense of cultivation, $90.75; receipts for 432½ bushels, $410.90; estimated value of the stalks, $125. Profit, $345.15. Premium, $25.

STATEMENT OF CULTIVATION.

Richard H. Jones, manager of the farm of John Stryker, and residing thereon, states that he planted about twelve acres of corn on a lot on said farm, which had been used seven years for pasture, and which is situated on the Floyd road. The land is a gravelly loam, and had no underdraining; there was no manure applied, and it was first plowed in the fall of 1869, seven inches deep and eleven inches furrow. The ground was planted May 18, 1870, with twelve-rowed Dutton corn, three feet apart, with from four to five kernels in the hill, and left about four where it exceeded that number. The corn was hoed twice, and the cultivator used three times. Five acres were surveyed off the south-west corner of the field. The crop was cut the first week in September, and shelled the first week in January. The stalks weighed 24,948 pounds, estimated at $10 per ton (being half the price of hay). The yield of corn was 25,200 pounds, or 86 9-10 bushels per acre.

JOHN STRYKER.

John Stryker, Rome, exhibited sample of a crop of potatoes grown upon 1.35 acres of land. Expense of cultivation, etc., $30.50; received for 575 bushels, at fifty cents, $287.50; profit, $257. Premium, $20.

STATEMENT OF CULTIVATION.

I raised the past season, upon 1.35 acres, 575 bushels of potatoes of good quality; being 425.9 bushels to the acre. Soil, gravelly loam, in good state of fertility. The land was used seven years for pasture, and was plowed in the fall of 1869, and planted May 5th, 1870, with seventeen bushels of rough Chili potatoes, two pieces in each hill. Cultivated often after coming up, and thoroughly hilled about July 1st. Dug, carefully measured, and sold the first part of October, at fifty cents per bushel.

JOHN STRYKER.

GRAIN AND SEEDS.

Winter Wheat.

1. M. E. Myers, Charlton	$3 00
2. H. Pine, Pittstown	2 00

Spring Wheat.

1. H. Pine	3 00

Rye.

1. H. Pine	3 00
2. A. E. Van Allen, Bethlehem	2 00

Barley, Two-rowed.

1. J. J. Deforest, Duanesburgh	3 00

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Oats.

1. G. W. Bender, New Scotland $3 00
2. H. Schoonmaker, Cedar Hill 2 00

Yellow Corn.

1. H. Pine 3 00
2. J. J. Deforest 2 00

White Corn.

1. Zerah Rider, Cambridge 3 00

Large Peas.

1. L. L. French, Richfield Springs 3 00

Large White Beans.

1. H. Pine 3 00
2. A. E. Van Allen 2 00

Small White Beans.

1. L. L. French 3 00

Kidney Beans.

1. L. L. French 3 00

Yellow Beans.

1. J. J. Deforest 3 00

Timothy Seed.

1. G. W. Bender 3 00

Flax Seed.

1. H. Pine 3 00

Buckwheat.

1. G. W. Bender 3 00
2. H. Schoonmaker 2 00

Early Somersetshire Oats.

O. K. Rice, Granville ..... Honorable mention.

Eight and Twelve-rowed Corn.

H. Schoonmaker ..... Honorable mention.

Collection of Roots.

D. W. Seely $5 00

JAMES L. INGALSBE.
LEWIS SHERRILL.
R. H. JONES,
Committee.

BUTTER.

For three packages made at any time:

1. A. B. Benham, Cortland $15 00
2. John Stryker, Rome 10 00
3. M. E. Myers, Charlton ..... Transactions.

For three packages made, one in June, one in August, one in November:

1. A. B. Benham $15 00
2. John Stryker 10 00
3. M. E. Myers ..... Transactions.

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For a package of winter butter:

1. John Stryker..... $5 00
2. Harvey Pine, Pittstown 3 00
3. L. L. French, Richfield Springs..... Transactions.

Zerah Rider, Cambridge.....Commended.

CHEESE.

Three cheeses, M. E. Myers..... $15 00
One old cheese, M. E. Myers, discretionary premium of..... 10 00

HONEY.

M. Quinby, St. Johnsville..... Honorable mention.

JOHN THOMAS.
R. W. PRATT.
Committee.

FRUITS.

Twenty Varieties of Apples.

1. Peter Van Wie, Bethlehem..... $10 00
2. H. Pine..... 5 00

Ten Varieties of Apples.

1. G. W. Bender..... 5 00
2. H. Pine..... 3 00
3. Peter Van Wie..... Transactions.

Best Dish of Apples of One Kind.

1. G. W. Bender..... $5 00
2. A. E. Van Allen..... .... Transactions.

Best Seedling Apple.

Peter Van Wie $5 00

W. H. BRISTOL, Owego.
O. B. GRIDLEY, Deansville.
L. RAMSDELL, Greenville.
Committee.

IMPLEMENTS, &C.

Syracuse Agricultural Works. Hubbard mower and self-raker.—There are some novelties in this machine which we describe. 1st. There are two motions, either of which can be adopted at pleasure; the first gives eighteen double or thirty-six single vibrations of the knife for each revolution of the driving wheel; the second motion gives twenty-seven double or fifty-four single vibrations. This is really a very decided advantage. 2d. There is a reduction in the number of the cogs to 180 3d. The motion is communicated through two sets of spur and one pair of bevel wheels. 4th. No part of the shafting is exposed to dust. 5th. The ratchets and pawls are removed from the driving wheels, and three of them are placed inside of each of the spur gears. 6th. The platform can be raised or lowered at pleasure, so that the cutting edge remains parallel to itself at all times. 7th. The driver's seat is hung upon two springs, which can be advanced or receded through a space of twenty. two inches, in order to adapt it to reaping or mowing.

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These points are all claimed as novelties by the maker, though the judges are not quite confident that some of them are so. Not having made actual trial of the machine, the committee do not feel competent to express any decided opinion on its merits, except to say that its mechanical execution reflects the greatest credit on the makers.

Bristol & Robbins, Owego. Seed drill.—This seems to be an excellent implement; but as there has so recently been an actual trial of these implements, we refrain from any further expression of opinion.

John G. Talbot, Sloansville, N. Y. Dash churn attachment.—A horizontal plate of iron is fastened to the shaft of the plunger by a pinching screw; this plate is penetrated by a slot through its entire length. A wheel, having its step fastened to the edge of the churn, has a slot in one of its arms, in which a tooth slides backward and forward, and is kept in any desired place by a pinching screw. This is engaged in the slot on the shaft of the plunger. By this arrangement the length of the stroke may be altered at pleasure. The advantage of this arrangement is, that a reciprocating motion is converted into a continuous one, and the necessity of working at arm's length is obviated. It is very simple in its arrangement, and is also durable and cheap. We are inclined to believe that it will prove a very useful assistant to the dairy maid.

J. P. Corbin, Whitney's Point, N. Y. Eureka butter worker.—This is an arrangement of a universal joint, by which the ordinary butter ladle is made to press upon the sides of the bowl and thus work out the buttermilk. The bowl itself may be wheeled round at pleasure, and the buttermilk can be emptied as often as is desired. The whole arrangement is cheap, simple and durable, and we are inclined to look upon it with much favor.

G. W. Edgcomb, Lima, N. Y. A pruning shear.—This is so arranged that when the handle is drawn downward the jaws of the shears close by an arrangement of levers. It has occurred to us that in drawing it downward there may be danger of breaking the limb; but as we had no opportunity of trying it, we cannot determine the point.

Horace L. Emery, Albany, N. Y. Clark's patent sectional boiler. Manufactured by Clark & Utter, Rockford, Ill. No. 1, $65, *without jacket;* $80 *with jacket. No.* 2, $120 *and* $140.—The No. 2 boiler exhibited is twenty and a half inches in diameter and the depth of the sections is eight and a quarter inches. They are of cast iron corrugated on the interior, so as to give a very large amount of fire surface; the lower section is an ash-pit; the second a fire-box; the remainder are the corrugated surfaces filled with water. The coal is put in from the top, and passes down through a magazine in the center to the fire-box. The boiler is supplied with water from a reservoir on the exterior. The steam from the boiler enters the top of the reservoir through a pipe, and it must therefore be strong enough to bear all the pressure on the boiler. The cold water enters the boiler from the reservoir, through a pipe in the lower part, by means of a cock and a check valve, which permits the cold water to flow into the boiler, but prevents the flow of hot water into the reservoir. The position of the water in the boiler is indicated by a glass tube on the outside. The sections are planed down on the edges, and India rubber packing is placed in the joints. The lower edge of the section is furnished with a lip, which prevents the blowing out of the packing. We are very favorably impressed with the apparatus. The only doubt of its efficacy that has occurred to us is the danger of incrustations of the boiler by lime water, which would impair the conducting power. The inventor claims that the sections used in the central portions, the next to the lowest as fire chamber, and the lowest as ash-pit, both being filled around the fire chamber and

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ash-pit with water, and constituting part of the boiler, and the water in the lowest section being comparatively at rest, the deposit, if any, will always be in this section and can be blown out when desired, and that this device makes the apparatus peculiarly free from liability to incrustation.

D. W. Seely, Albany, N. Y. Egg Carrier. Price, $10.—This consists of a series of trays two and a half inches deep, which are divided by means of stiff papers into compartments one and a half inch square. These papers are perforated with holes which carry four cords, upon which the end of the egg rests, as on an elastic cushion. There is a coarse cloth nailed over the bottom of each box, which rests upon the upper ends of the eggs in the tray next below it. There is a nest of shallower boxes on the top, and when the eggs are to be taken out the tray is turned bottom upward upon this, and they are then very easily removed. There are twelve dozen eggs in each tray and nine trays in each box. By this arrangement the eggs are always kept on end; they never touch each other, and are always on an elastic cushion, which pretty effectually resists breakage. We are of opinion that this is a valuable contrivance, and that it meets a real want of egg dealers.

S. C. Boughton, Waterford, N. Y. Driving bit.—This seems well adapted to restrain a vicious and unruly horse; but it is not claimed that it is adapted to horses not vicious. It is adjustable to different grades of severity by changing the buckle on the strap.

JOHN STANTON GOULD,
DANIEL DONCASTER,
Committee.

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REPORT OF THE TREASURER.

Luther H. Tucker, *Treasurer, in account with* The New York State Agricultural Society.

Dr.

To cash on hand from last account....	$2,299 45	
" U. S. securities on hand from last account.....	15,678 00	
		$17,977 45
Receipts of year, viz.:		
Life memberships.....	$220 00	
Annual memberships.....	897 00	
Col. L. G. Morris, for special premium.....	200 00	
Utica subscription for implement trial...	1,000 00	
State fair receipts at Utica.....	20,309 72	
Net refreshment rental of grounds.....	654 00	
Interest account.....	976 13	
Miscellaneous.....	51 82	
Total receipts of year.....		24,308 67
		$42,286 12

Cr.

By payments of year per schedules annexed:	
Schedule A. Premiums, etc., at winter meeting.....	$388 54
" B. Premiums of previous years.....	69 00
" C. Salaries and clerk hire.....	5,150 00
" D. Incidental expenses.....	586 99
" E. Postages.....	467 89
" F. Library and museum.....	474 68
" G. Printing and stationery.....	746 02
" H. Veterinary investigations.....	162 78
" I. State fair expenses.....	6,080 46
" K. Premiums and premium expenses.....	8,007 12
Total disbursements as vouched.....	$22,133 48

On hand:		
U. S. securities as above.....	$15,678 00	
Cash in bank to Society's credit.....	4,474 64	
		20,152 64
		$42,286 12

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We, the undersigned, do hereby certify that we have examined the above accounts, and compared the same with the vouchers therewith presented, and find the same to be correct, and that all the payments have been accounted for. Also, that we have had exhibited to us the securities above mentioned, and the bank book showing the balance above stated.

Dated ALBANY, *February* 8, 1871.

JAMES GEDDES,
B. F. ANGEL,
Auditing Committee.

M. R. PATRICK, *Ex-President.*
T. L. HARISON, *Secretary.*

SCHEDULE A.

Premiums, etc., at Winter Meeting.

M. E. Myers, premiums, per voucher 1	$50 00
Ai. Pine, premiums, per voucher 2	30 00
Z. Rider, premiums, per voucher 3	22 00
P. Van Wie, premiums per voucher 4	15 00
W. P. Otley, premiums, per voucher 5	8 00
A. E. Van Allen, premiums, per voucher 6	7 00
H. Schoonmaker, premiums, per voucher 7	6 00
J. H. Wayne, premiums, per voucher 8	5 00
T. L. Harison, bills of advertising, per voucher 9	59 10
John L. Coon, services, per voucher 10	20 00
W. H. Bogart, services, per voucher 11	15 00
E. Keays, services, per voucher 12	12 00
T. L. Harison, incidentals, per voucher 13	6 35
S. R. Earls, incidentals, per voucher 14	1 75
T. L. Harison, bills of advertising, per voucher 15	13 25
T. L. Harison, bills of advertising, per voucher 16	13 50
W. J. White, bills of advertising, account of 1871, pre voucher 17	88 59
L. Tucker & Son, bills of advertising, account of 1871, per voucher 18	16 00
	$388 54

SCHEDULE B.

Premiums, etc., of Previous Years.

B. N. Payne, services in 1869, per voucher 2	$30 00
M. & T. Hayden, premiums, 1869, per voucher 3	3 00
George Hegeman, medals, per voucher 4	26 00
J. H. Wilson & Co., premiums, per voucher 5	10 00
	$69 00

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Schedule C.

Salaries and Clerk Hire.

T. L. Harison, Secretary, per vouchers 1 to 12 inclusive,	$3,000 00
S. R. Earls, Clerk, per vouchers 13 to 19	1,250 00
W. J. White, Clerk, per vouchers 22, 23	250 00
L. H. Tucker, Treasurer, per voucher 25	400 00
Dr. Asa Fitch, Entomologist, 1 quarter, per voucher 26,	250 00
	$5,150 00

Schedule D.

Incidental Expenses.

T. L. Harison, sundries, per voucher 1	$56 02
E. Nusbaum, services, per voucher 2	10 00
E. Nusbaum, services, per voucher 3	10 00
E. Nusbaum, services, per voucher 4	10 00
T. L. Harison, sundries, per voucher 5	2 93
T. L. Harison, sundries, per voucher 6	11 12
E. Nusbaum, services, per voucher 7	10 00
T. L. Harison, sundries, per voucher 8	39 70
T. L. Harison, sundries, per voucher 9	11 20
L. H. Tucker, receipt and check stamps, per voucher 10	4 00
Hertz & Bro., furniture repairs, per voucher 11	15 75
Edward Keays, services, per voucher 12	125 00
T. L. Harison, sundries, per voucher 13	147 07
T. L. Harison, sundries, per voucher 14	75 25
T. L. Harison, sundries, per voucher 15	41 93
W. J. White, sundries, per voucher 16	7 02
E. Nusbaum, services, per voucher 17	10 00
	$586 99

Schedule E.

Postages Account.

T. L. Harison, for postages, per voucher 1	$8 60
T. L. Harison, for postages, per voucher 2	35 60
T. L. Harison, for postages, per voucher 3	7 55
T. L. Harison, for postages, per voucher 4	109 96
T. L. Harison, for postages, per voucher 5	34 75
T. L. Harison, for postages, per voucher 6	25 50
T. L. Harison, for postages, per voucher 7	54 80
T. L. Harison, for postages, per voucher 8	107 20
T. L. Harison, for postages, per voucher 9	20 58
T. L. Harison, for postages, per voucher 10	38 34
T. L. Harison, for postages, per voucher 11	25 01
	$467 89

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SCHEDULE F.

Library and Museum.

T. L. Harison, for library, per voucher 1	$3 10
T. L. Harison, for library, per voucher 2	4 30
T. L. Harison, for library (insurance), per voucher 3	30 00
T. L. Harison, for library, per voucher 4	16 00
T. L. Harison, for library, per voucher 5	8 00
T. L. Harison, for library, per voucher 6	9 40
C. Van Benthuysen & Sons, binding, etc., per voucher 7	30 75
Anna M. Hague, drawings, per voucher 8	11 00
T. L. Harison, books and subscriptions, per voucher 9	69 80
T. L. Harison, transportation, etc., per voucher 10	21 80
J. Q. A. Warren, library, per voucher 11	9 00
B. W. Johnson, library, per voucher 12	80 00
W. J. White, library, per voucher 13	177 03
L. Tucker & Son, library, per voucher 14	4 50
	$474 68

SCHEDULE G.

Printing and Stationery.

T. L. Harison, sundries, per voucher 1	$4 00
T. L. Harison, sundries, per voucher 2	1 55
C. Van Benthuysen & Sons, sundries, per voucher 3	422 56
C. Van Benthuysen & Sons, sundries, per voucher 4	205 91
T. L. Harison, sundries, per voucher 5	12 70
T. L. Harison, sundries, per voucher 6	22 25
Joel Munsell, sundries, per voucher 7	23 50
W. J. White, sundries, per voucher 8	53 55
	$746 02

SCHEDULE H.

1. *Abortion in Cattle Investigation.*

Dr. W. H. Carmalt, expenses, per voucher 1	$19 06
G. A. Van Wagenen, services, per voucher 2	63 92
	$82 78

2. *Foot and Mouth Disease Investigation.*

James Law, services and expenses, per voucher 3	80 00
	$162 78

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Schedule I.

Expenses of State Fair, Utica, October, 1870.

H. Bowen, general superintendent, voucher 1,	$175 00
H. Bowen, general superintendent, expenses, etc., voucher 2	125 00
E. A. Bowen, assistant superintendent, voucher 3	54 00
T. R. Goodwin, messenger, voucher 4	30 00
J. F. Quick, care of horses, voucher 5	28 00
T. V. Maxon, superintendent of cattle, voucher 6	60 00
J. A. C. Kellogg, assistant superintendent of cattle, voucher 7	40 00
J. F. Quick, superintendent of horses, voucher 8	48 00
F. Bowen, assistant superintendent of horses, voucher 9	40 00
J. F. Quick, for horses, voucher 10	45 00
S. W. Smith, superintendent of sheep and swine, voucher 11	42 00
C. D. Remington, assistant superintendent of sheep and swine, voucher 12	20 00
R. P. White, superintendent of poultry, voucher 13	30 00
C. Boughton, superintendent of dairy hall, voucher 14	36 00
H. W. Doctor, assistant superintendent of dairy hall, voucher 15	25 00
J. L. Ingalsbe, superintendent grain and vegetables, voucher 16	30 00
J. W. Smith, superintendent implement department, voucher 17	120 40
W. McGowan, assistant superintendent implement department, voucher 18	102 50
H. B. Bartlett, superintendent stove department, voucher 19	30 00
H. S. Jarvis, superintendent domestic hall, voucher 20	36 00
W. C. Pollard, assistant superintendent domestic hall, voucher 21	30 00
A. G. Howard, superintendent of floral hall, voucher 22	60 00
M. C. Remington, superintendent of forage, voucher 23	42 00
M. C. Remington, Jr., assistant superintendent of forage, voucher 24	20 00
W. H. Bogart, superintendent press, voucher 25	30 00
Carried forward	$1,298 90

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Brought forward		$1,298 90
Hiram Segur, gatekeeper and policeman, voucher 26	$92 00	
G. B. R. Whipple, gatekeeper and policeman, voucher 27	82 00	
Edw. Marshall, gatekeeper and policeman, voucher 28	57 00	
R. G. Wands, gatekeeper and policeman, voucher 29	32 50	
W. G. Brainard, gatekeeper and policeman, voucher 30	30 50	
Geo. W. Grant, gatekeeper and policeman, voucher 31	29 50	
E. W. Green, gatekeeper and policeman, voucher 32	29 00	
C. E. Segur, gatekeeper and policeman, voucher 33	28 50	
W. H. Coon, gatekeeper and policeman, voucher 34	28 00	
Jas. Tompkins, gatekeeper and policeman, voucher 35	27 00	
E. B. Van Cott, gatekeeper and policeman, voucher 36	27 00	
D. D. Tompkins, gatekeeper and policeman, voucher 37	27 00	
		490 00
Jacob Emerich, detective and policeman, voucher 38	$58 20	
D. Morganstein, detective and policeman, voucher 39	58 20	
R. A. Smith, police magistrate, voucher 40	42 00	
J. P. Levey, policeman, voucher 41	35 00	
W. H. Soper, policeman, voucher 42	35 00	
H. D. Turner, policeman, voucher 43	32 00	
S. C. Boughton, policeman, voucher 44	32 00	
N. Goodwin, policeman, voucher 45	30 00	
C. Kelly, policeman, voucher 46	30 00	
E. A. Newbury, policeman, voucher 47	28 00	
A. B. Hay, policeman, voucher 48	28 00	
M. A. Bell, policeman, voucher 49	26 50	
Thos. Smith, policeman, voucher 50	24 50	
Isaac C. Otis, policeman, voucher 51	24 00	
J. H. Carroll, policeman, voucher 52	23 50	
W. J. Lewis, policeman, voucher 53	23 00	
G. W. Stoddard, policeman, voucher 54	22 00	
Geo. H. Herbert, policeman, voucher 55	22 00	
Hiram Wands, policeman, voucher 56	21 00	
P. Edmister, policeman, voucher 57	21 00	
G. F. Cleveland, policeman, voucher 58	20 00	
Carried forward	$635 90	$1,788 90

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Brought forward	$635 90	$1,788 90
F. J. Ross, policeman, voucher 59	20 00	
R. A. Smith, policeman, voucher 60	20 00	
A. P. Smith, policeman, voucher 61	15 00	
C. V. Schram, policeman, voucher 62	12 00	
		702 90
J. C. Cuyler, clerk in business office, voucher 63	$100 00	
C. F. Williston, clerk in business office, voucher 64	64 00	
J. S. Dickerman, clerk in business office, voucher 65	64 00	
S. A. Bunce, clerk in business office, voucher 66	64 00	
Cyrus Hayden, clerk in business office, voucher 67	64 00	
J. K. Seaver, clerk in business office, voucher 68	48 00	
		404 00
J. H. Farrell, clerk in ticket office, voucher 69,	$40 00	
T. W. Cantwell, clerk in ticket office, voucher 70	40 00	
L. T. Milligan, clerk in ticket office, voucher 71	25 00	
W. G. Tucker, clerk in ticket office, voucher 72	25 00	
H. C. Milligan, clerk in ticket office, voucher 73	15 00	
J. A. Stimson, clerk in ticket office, voucher 74	15 00	
F. S. Hawe, clerk in ticket office, voucher 75.	15 00	
W. S. Buckbee, clerk in ticket office, voucher 76	15 00	
B. Brumaghim, clerk in ticket office, voucher 77	15 00	
E. D. Ronan, clerk in ticket office, voucher 78,	15 00	
J. McDonough, clerk in ticket office, voucher 79	15 00	
E. L. Killip, clerk in ticket office, voucher 80.	15 00	
R. A. Wallace, clerk in ticket office, voucher	15 00	
81	15 00	
P. H. Thomas, clerk in ticket office, voucher 82	10 00	
W. Hurst, clerk in ticket office, voucher 83..	5 00	
G. W. Best, clerk in ticket office, voucher 84.	3 00	
		283 00
John L. Coon, services, cartages, etc., voucher 85	$54 50	
A. D. Allen, team work, voucher 86	40 00	
Carried forward	$94 50	$3,178 80

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Brought forward	$94 50	$3,178 80
John Smith, labor, etc., voucher 87	12 25	
W. C. Bartlett, labor, etc., voucher 88	8 00	
		114 75
C. Van Benthuysen & Sons, printing, etc., voucher 89	$236 62	
C. Van Benthuysen & Sons, printing, etc., voucher 90	1,177 89	
Grove & Bailey, printing, etc., voucher 91	44 92	
Utica Herald office, printing, etc., voucher 92,	39 50	
Utica Herald office, printing, etc., voucher 93,	3 50	
		1,502 43
D. M. Johnson, hotel bill of judges, etc., voucher 94	$261 00	
D. M. Johnson, hotel bill of treasurer's clerks, voucher 95	149 05	
T. F. Butterfield, carriage hire, voucher 96	90 50	
		500 55
L. H. Tucker, traveling expenses, voucher 97,	$17 60	
T. L. Harison, traveling expenses, voucher 98,	9 00	
T. L. Harison, traveling expenses, voucher 99,	8 75	
T. L. Harison, traveling expenses, voucher 100,	5 75	
T. L. Harison, miscellaneous expenses, voucher 101	370 87	
I. Nusbaum, posting bills, voucher 102	92 78	
Fowler & Fitch, erections on grounds, voucher 103	58 60	
J. C. Cuyler, miscellaneous expenses, voucher 104	42 36	
A. G. Howard, floral hall expenses, voucher 105	39 56	
C. F. Williston, miscellaneous expenses, voucher 106	33 49	
T. L. Harison, miscellaneous expenses, voucher 107	24 12	
T. L. Harison, miscellaneous expenses, voucher 108	17 50	
W. J. Supple, discussion expenses, voucher 109	10 00	
J. G. Fowler, grain for horses, voucher 110	9 56	
J. M. Childs, sundries, voucher 111	6 20	
Thomas Horton, ice, voucher 112	5 71	
Comstock Bros., brooms, voucher 113	4 00	
M. Reynolds, banner repairs, voucher 114	3 00	
James Martin, hardware, voucher 115	17 08	
T. L. Harison, traveling expenses, voucher 116,	8 00	
		783 93
		$6,080 46

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SCHEDULE K.

Premiums, and Premium Expenses at Utica Fair.

Walcott & Campbell, premiums in class one, voucher 1..	$310 00
Walcott & Campbell, premiums in class one, voucher 2..	255 00
Joseph Hilton, class one, voucher 3.....	150 00
Robert Bell, class one, voucher 4.....	136 00
Truman Baker, class one, voucher 5	115 00
George Butts, class one, voucher 6	115 00
Thomas J. Hand, class one, voucher 7	100 00
Walter Cole, class one, voucher 8	90 00
Thomas J. Hand, class one, voucher 9	80 00
T. H. Stryker, class one, etc., etc., voucher 10.....	64 00
Benjamin Fellows, class one, voucher 11	45 00
J. M. Rockwell, class one, voucher 12	40 00
John Shattuck, class one, etc., voucher 13.....	40 00
R. Brodie, class one, voucher 14	35 00
Benjamin Fellows, class one, voucher 15	30 00
J. H. McHenry, class one, voucher 16.....	30 00
Andrew Tuck, class one, voucher 17.....	30 00
E. C. Holden, class one, voucher 18	25 00
J. T. Chamberlain, class one, voucher 19.....	20 00
Brodie & Son, class one, voucher 20.....	20 00
W. E. Arnold, class one, voucher 21.....	15 00
J. L. Blackstone, class one, voucher 22.....	15 00
T. Hasslekuse, class one, voucher 23	10 00
W. A. Peebles, class one, voucher 24	10 00
G. B. Nelson, class one, voucher 25	10 00
Jas. M. Felt, class one, voucher 26	10 00
William Sellers, class one, voucher 27.....	10 00
Alden Goldsmidt, class two, voucher 28.....	230 00
L. G. Morris, class two, voucher 29.....	130 00
Edwin Thorne, class two, voucher 30	90 00
H. Brown, class two, voucher 31	40 00
S. J. Look, class two, voucher 32.....	40 00
J. S. Foster, class two, etc., voucher 33.....	35 00
L. Kenney, class two, voucher 34.....	30 00
George Hamil, class two, voucher 35	30 00
Jas. L. Treat, class two, voucher 36.....	25 00
George Gray, class two, voucher 37	20 00
J. P. D. Snell, class two, voucher 38.....	20 00
T. T. Cavanaugh, class two, etc., voucher 39	20 00
E. Z. Wright, class two, voucher 40	20 00
D. Pugh, class two, etc., voucher 41	17 00
C. G. Riggs, class two, voucher 42	15 00
Leach & Hamilton, class two, voucher 43.....	15 00
R. A. Jones, class two, voucher 44	10 00
W. B. Boyd, class two, voucher 45	10 00
E. A. Newbury, class two, voucher 46	10 00
Carried forward.....	$2,617 00

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Brought forward	$2,617 00
George I. Wheeler, class two, voucher 47	10 00
J. P. Levy, class two, voucher 48	8 00
G. A. Hosington, class two, voucher 49	8 00
Holmes Rich, class two, voucher 50	5 00
H. Caige, class two, voucher 51	5 00
William Cooper, class two, voucher 52	5 00
Jas. M. Matthews, class two, voucher 53	4 00
Luke Coan, class two, voucher 54	4 00
William Chamberlain, class three, voucher 55	161 00
J. Y. Bicknell & Co., class three, voucher 56	108 00
Jurian Winne, class three, voucher 57	105 00
Jos. Harris, class three, voucher 58	105 00
Walcott & Campbell, class third, voucher 59	80 00
S. M. Thomas, class third, voucher 60	70 00
Charles Lynch, class third, voucher 61	65 00
Joseph Harris, third class, voucher 62	65 00
O. Howland, third class, voucher 63	62 00
G. H. Warner, class third, voucher 64	57 00
S. P. Huffstater, class third, voucher 65	35 00
George H. Brown, class three, voucher 66	35 00
N. Barns, class three, voucher 67	33 00
J. F. Converse, class three, voucher 68	30 00
Taber & Holmes, class three, voucher 69	25 00
McLean & Mather, class three, voucher 70	25 00
Carl Heyne, class three, voucher 71	25 00
R. Gibson, class three, voucher 72	25 00
Jacob Albright, class three, voucher 73	20 00
John P. Gray, class three, voucher 74	15 00
Thomas Gould, class three, voucher 75	14 00
Stephen Treen, class three, voucher 76	8 00
Robert Ellis, class three, voucher 77	8 00
C. H. & B. D. Wolcott, class three, voucher 78	8 00
E. A. Wendell, class three, voucher 79	8 00
W. R. Dudley, class three, voucher 80	6 00
Peter Martin, class three, voucher 81	5 00
Warren Baker, class three, voucher 82	5 00
Ray Brothers, class three, voucher 83	4 00
James Patton, class three, voucher 84	3 00
C. H. Townsend, class three, voucher 85	3 00
Edw. Warr, class three, voucher 86	3 00
Charles Fink, class three, voucher 87	3 00
James Goold & Co., class four, voucher 88	25 00
Phebe Brownell, class four, voucher 89	21 00
F. T. Woodford, class four, voucher 90	20 00
W. H. Duval, class four, voucher 91	20 00
Mrs. W. C. Burritt, class four, voucher 92	17 00
J. Knox, class four, voucher 93	10 00
Darling, Brother & Co., class four, voucher 94	10 00
Carried forward	$4,013 00

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Brought forward	$4,013 00
Charity Hakes, class four, voucher 95	10 00
J. S. Irwin, class four, voucher 96	5 00
S. & J. Smith, class four, voucher 97	5 00
W. Selover & Co., class four, voucher 98	5 00
C. H. Wheadon, class four, voucher 99	3 00
M. E. Myers, class five, voucher 100	95 00
C. W. Crosman, class five, voucher 101	58 00
John Torpy, class five, voucher 102	51 00
Mrs. W. H. Graves, class five, voucher 103	41 00
Clear Spring factory, class five, voucher 104	35 00
L. L. French, class five, voucher 105	35 00
S. Morris, class five, voucher 106	30 00
Harriet E. Lamb, class five, voucher 107	28 00
Abram Stone, class five, voucher 108	26 00
Robert Oliver, class five, voucher 109	24 00
Mrs. W. Halstead, class five, voucher 110	22 00
L. L. Wight, class five, voucher 111	20 00
William Newton, class five, voucher 112	20 00
J. Corbin, class five, voucher 113	18 00
Ladneville Factory, class five, voucher 114	15 00
H. T. Brown, class five, voucher 115	15 00
E. B. Wetmore, class five, voucher 116	14 00
W. F. Ottly, class five, voucher 117	10 00
T. K. Tibbetts, class five, voucher 118	10 00
John Brown, class five, voucher 119	10 00
Mrs. O. Comstock, class five voucher 120	8 00
P. Miller, class five, voucher 121	8 00
Pomeroy Jones, class five, voucher 122	5 00
Abram Stone, class five, voucher 123	5 00
Mrs. Ann Tillson, class five, voucher 124	5 00
J. B. Cushman, class five, voucher 125	5 00
H. Ames, class five, voucher 126	5 00
Henry Grems, class five, voucher 127	5 00
Mrs. H. Rose, class five, voucher 128	5 00
Mary Whitney, class five, voucher 129	5 00
Jas. Chrisman, class five, voucher 130	3 00
P. Miller, class five, voucher 131	3 00
Mrs. O. B. Gridley, class five, voucher 132	3 00
Ellwanger & Barry, class six, voucher 133	72 00
Jas. Vick, class six, voucher 134	47 00
E. Ware Sylvester, class six, voucher 135	30 00
Henry Wagner class six, voucher 136	30 00
Briggs & Bro., class six, voucher 137	27 00
J. W. Alexander, class six, voucher 138	18 00
O. B. Gridley, class six, voucher 139	12 00
G. W. Lawrence, class six, voucher 140	7 00
R. B. Shaw, class six, voucher 141	6 00
Grove Penny, class six, voucher 142	4 00
Carried forward	$4,936 00

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Brought forward		$4,936 00
Ellwanger & Barry, class six, voucher 143		3 00
E. Ware Sylvester, class six, voucher 144		3 00
F. W. Boyce, class six, voucher 145		3 00
B. W. Churchill, class six, voucher, 146		2 00

Payments to Judges.

F. R. Elliott, services and expenses, voucher 147	$25 00	
George Short, 2d, services and expenses, voucher 148	20 22	
C. T. Hulburd, services and expenses, voucher 149	20 00	
Thos. Bell, services and expenses, voucher 150,	19 30	
O. K. Rice, services and expenses, voucher 151	18 30	
William Birnie, services and expenses, voucher 152	17 00	
H. D. Tillkampf, services and expenses, voucher 153	15 00	
Edw. Harper, services and expenses, voucher 154	13 00	
C. B. Way, services and expenses, voucher 155	12 86	
H. C. Holmes, services and expenses, voucher 156	12 30	
C. C. Bradley, Jr., services and expenses, voucher 157	12 12	
Samuel Bayliss, services and expenses, voucher 158	12 10	
Jos. E. Ely, services and expenses, voucher 159	12 00	
Rich Peck, services and expenses, voucher 160,	11 40	
W. E. Arnold, services and expenses, voucher 161	11 04	
John Banks, services and expenses, voucher 162	10 72	
Alden Goldsmith, services and expenses, voucher 163	10 00	
Anthony Hoffman, services and expenses, voucher 164	10 00	
E. P. Howlett, services and expenses, voucher 165	9 20	
B. A. Sweet, services and expenses, voucher 166	8 90	
Harris Lewis, services and expenses, voucher 167	7 88	
Josiah Shull, services and expenses, voucher 168	7 76	
Carried forward	$296 10	$4,947 00

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Brought forward	$296 10	$4,947 00
P. C. Kilham, services and expenses, voucher 169	6 12	
T. W. Moore, services and expenses, voucher 170	6 00	
X. A. Willard, services and expenses, voucher 171	5 88	
M. Butler, services and expenses, voucher 172,	5 75	
John D. Wing, services and expenses, voucher 173	5 00	
Chas. Downing, services and expenses, voucher 174	5 00	
A. V. H. Ross, services and expenses, voucher 175	5 00	
Walter Cole, services and expenses, voucher 176	5 00	
T. W. Moore, services and expenses, voucher 177	5 00	
W. W. Ingram, services and expenses, voucher 178	5 00	
Geo. Tweddle, services and expenses, voucher 179	3 90	
		353 75

Expenses of Trial of Implements and Machinery.

Jas. Geddes, expenses, implement trial, voucher 180	$446 70	
Jas. Geddes, services, implement trial, voucher 181	350 00	
D. M. Johnson, expenses of judges, voucher 182	269 17	
R. Wood, expenses of judges, voucher 183	84 00	
T. F. Butterfield, expenses of judges, voucher 184	52 00	
Sanford Howard, services, etc., as judge, voucher 185	107 00	
D. M. Greene, services, etc., as judge, voucher 186	101 62	
A. A. Sweet, services, etc., as judge, voucher 187	86 50	
H. F. French, services, etc., as judge, voucher 188	80 35	
Dyer Williams, services, etc., as judge, voucher 189	52 50	
Joseph Harris, services, etc., as judge, voucher 190	36 00	
C. F. Williston, clerk to judges, voucher 191,	120 00	
J. C. Cuyler, clerk to judges, voucher 192	120 00	
Carried forward	$1,905 84	$5,300 75

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Brought forward	$1,905 84	$5,300 75
J. S. Dickerman, clerk to judges, voucher 193,	32 00	
Starbuck Bro., break, voucher 194	50 84	
		1,988 68
Mrs. W. H. Graves, premium per voucher 195		8 00
J. H. Wilson, premium per voucher 196		10 00
Strickland & Co., silver ware for premiums, voucher 197		77 60
John Shattuck, balance due on premiums, voucher 198,		10 00
T. L. Harison, sundries, voucher 199		2 40
Burdett Loomis, premiums, voucher 200		65 00
Mrs. J. T. Van Namee, premiums, voucher 201		69 00
George Hegeman, medals, voucher 202		456 05
W. J. White, expenses on medals, voucher 203		19 64
		$8,007 12

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THE PRINCIPLES OF BREEDING DOMESTIC ANIMALS.

LECTURE DELIVERED BEFORE THE NEW YORK STATE AGRICULTURAL SOCIETY, AT THE ANNUAL MEETING, FEBRUARY 8, 1871.

By James Law, M. R. V. C.,
Professor of Veterinary Science in Cornell University, etc., etc.

Mr. Chairman and Gentlemen:

"Stock breeding" is quite as familiar to many of you as to myself; and yet I have chosen it for the subject of my present address, in the hope that, by arranging in order the general laws and principles of the science, I may occupy the time profitably, even if nothing new be advanced.

To this end I will have occasion to notice: 1st. The elaboration in the male and female systems of the elements which unite to form the germ of the future being. 2d. The evidences of vitality and growth in the germ formed by this union. 3d. The mode of nourishment of the embryo in the womb. 4th. The healthy or morbid states of the generative organs which contribute to fertility and barrenness. 5th. The fundamental law of the transmission of personal qualities. 6th. The known causes of variation from the ancestral type of a race. And, 7th. The means placed in the hands of the breeder whereby he may obtain and perpetuate desirable changes.

In the higher animals the sexes, male and female, are resident in different individuals, and the union of the two is essential to reproduction. The generative element furnished by the female is the *ovum* or egg, and that of the male the seminal fluid, or, more precisely, its actively moving filament, the *spermule*, or *spermatozoon*.

The *ovum* is developed in the ovary in the center of a semi-fluid, globular mass, the *Graäfian vesicle*, of which several hundred may be found in the ovary at the same time, and in all stages of development. Some are so small as to require the aid of the microscope to render them manifest, while others, nearly matured, amount to an inch in

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diameter. In the very young they remain in the small or undeveloped condition, but when the female approaches maturity, and can assimilate more material than is wanted for the body growth, one or more of these vesicles rapidly enlarges, or ripens, and finally bursts, discharging the ovum into the fallopian tube, by which it is to reach the womb. This ripening and discharge of ova takes place periodically at the times of *heat.* It is most vigorous, and the ova are the most perfect, in the strong and healthy adult, but is absent in the very young and old, and in the diseased. In the conditions of weak or poor health, it is often noticed that the periods of heat are irregular, and in such cases the ovum is equally deficient in development of vital power.

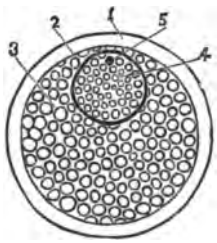

FIG. 1.

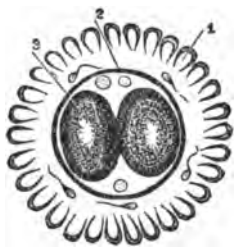

FIG. 2.

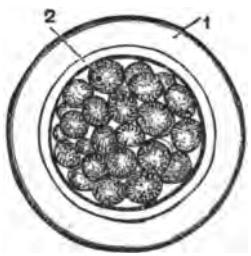

FIG. 3.

Fig. 1. Mammalian ovum as it leaves the ovary. 1. Zona pellucida. 2. Tunic of the yolk. 3. Yolk granules. 4. Germinal vesicle. 5. Germinal spot.

Fig. 2. Impregnated ovum, showing layer of club-shaped cells 1, yelk membrane 2, and yelk 3, divided into its two first segments.

Fig. 3. Ovum from the lower part of the Fallopian tube, the cleavage of the yelk having resulted in the formation of many spheroidal bodies 2.

As discharged into the fallopian tube, the mature ovum is a microscopic, globular mass, inclosed in a layer of cells, the *discus proligerus*, within which is clear yolk or vitelline membrane, inclosing the granular yolk, and its germinal vesicle and spot.

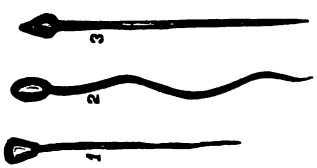

FIG. 4.

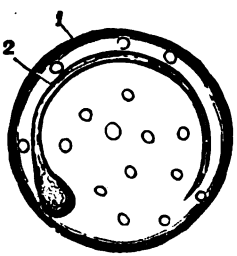

FIG. 5.

Fig. 4. Spermatozoa of the dog 1, ox 2, and rabbit 3.

Fig. 5. Cell from a secreting duct of the testicle containing a spermatozoon 2.

The *semen, or male generative element*, is formed in the convoluted canals of the testicle, and consists of an albuminous fluid containing

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myriads of actively moving filaments (zoosperms, spermules or spermatozoa), comparable by their general form and mode of progression to tadpoles, only microscopically minute. These are developed in cells in the secretive tubes of the testicle, and only when they arrive at maturity are they set free by the rupture of the cell wall. Like as in the female, they are only fully developed in the healthy and vigorous adult. In weak conditions, or when the connections with the female are too frequent, they may fail to attain a development requisite to fecundation.

The fully developed *spermatozoon* manifests its vitality by extremely rapid darting movements, and by means of this innate power of locomotion it finds its way through the womb and Fallopian tube to meet and fertilize the ovum on its escape from the ovary. The excitement of the generative organs consequent on this connection of the sexes determines an increased flow of blood to the ovary and the rapid increase and rupture of one or more *Graäfian* vesicles, so that on reaching the Fallopian tubes the spermules find the ova waiting to be fertilized. In this we see a provision for the preservation of the ovum, as it perishes before reaching the womb if it has not previously come in contact with the male element.

Neither of these elements is in itself viable; but the common mass formed by their union is endowed with viability and self-developing power. Either must perish without the other; but united they show at once active, vital movements. They take in surrounding nutrient material to build up their substance, and finally develope into an independent living being, the counterpart of the race from which it sprang, and of its own particular parents in all the qualities of mind and form. It is one of the marvels of creation that a microscopic particle of *protoplasm*, which does not differ materially to appearance in the human being, the horse, the ram nor the rat, should yet have the power of assimilating nutritive pabulum and building up a highly complex organism which shall resemble its parents even to the color and turn of a hair. That a particle of matter perceptible only by the higher powers of the microscope should contain the different elements of living substance, which determine the formation of bone, sinew, gristle, muscle, brain, nerve, horn and hair, and so disposed that they build up these and other elements into the complex but beautifully harmonious bodily frame, is a marvel of power and order, which strikes the thoughtful mind with awe, as if brought into contact with the work of creation itself. We feel in the presence of such facts that our vision is too limited to explain the Almighty's mode of working;

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but, on the other hand, we can rely on the constancy and inviolability of these laws, and though ignorant of their cause, avail of them in improving our stock and benefiting humanity.

The changes in the ovum after contact with the spermules consist in, primarily, a series of internal movements in the yolk, resulting in its division into two masses, then into four, then into eight, sixteen, thirty-two, sixty-four (see Figs. 2 and 3), and so on until the mass at first irregularly undulated becomes uniformly smooth and is covered by a membrane. This membrane undergoes a thickening at one point of its surface, and here the rudiments of the young animal at once begin to appear.

The ovum has meanwhile reached the womb, where it is embedded in a glutinous secretion which lines that organ throughout, and by degrees acquires that connexion with the maternal organism, which subsists until parturition. In place of tracing the future development of the embryo, I will merely draw attention to the mode of connexion

Fig. 6. Diagram of the early fœtus surrounded by its membranes in the womb: 1, Wall of womb: 2, Chorion: 3, Allantois: 4, Amnois: 5, Allantoid sac: 6, Amniotic sac.

of mother and offspring during the life within the womb. The young animal is enclosed in two water bags, one placed within the other. In the inner bag (amnios) the fœtus floats, and this in its turn floats in the outer one (allantois).

This last is separated from the walls of the womb by a thick membrane (chorion), abundantly supplied with blood vessels, which communicate only with those of the offspring. The connexion between this outer membrane and the womb it is important to note. This connexion explains the system of nutrition of the fœtus, and though differing in detail in the various races of animals, yet pre-

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sents a common character in all. The inner surface of the virgin womb, though perfectly smooth and uniform to the eye, is really perforated by many minute orifices, some of which are only shallow blind sacs, while others, deep and branching, are the openings of true secreting glands, as shown in the adjacent diagram from the womb of a bitch. These glands, situated in the substance of the wall of the womb, are abundantly supplied with vessels, and secrete or separate from the blood of the mother a fluid (uterine milk), on which the fœtus is supported during its intra-uterine life. Into the dilated openings of these gland ducts project processes from the surface of the outer fœtal membrane (the chorion), which processes are abundantly permeated with vessels communicating with those in the body of the

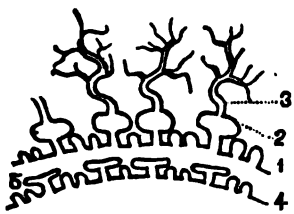

Fig. 7.

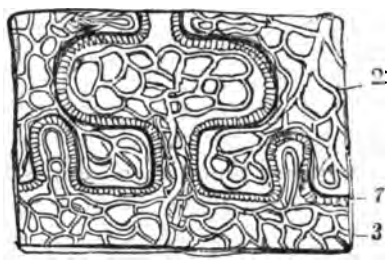

Fig. 8.

Fig. 7. Ideal section of the womb (1), and chorion (4), of a bitch: 2, Mucous follicles: 3, Ducts of a secreting gland of the womb: 5, Villi on the surface of the chorion.

Fig. 8. Section from the surface of the womb and chorion, showing the opening of a uterine secreting gland, with the villus of the chorion entering it: 1, Basement membrane and layer of epithelium which separates the vessels of the womb 2, from those of the chorion 3.

fœtus, through the navel string. These processes projecting into the gland ducts, take up the nutrient fluid (uterine milk), and transmit it through its vessels into the body of the fœtus. Be it observed that in this dovetailing of the processes and the membrane of the fœtus into the gland orifices in the wall of the womb, the vessels communicating with the fœtus are at all points separated from those of the mother by an intervening layer of cells, so that the one may be withdrawn from the other without the loss of a single drop of blood. The young animal, even within the womb, is, therefore, supported by a nutritious fluid separated from the blood of the mother as the milk is after birth; so that, setting aside the breathing process, the life before and that after parturition are closely analogous. At this stage, therefore, the mother is as little likely to affect the development of the young as during suckling, and we are once more thrown back upon the primary microscopic germs as possessing all the powers of varied development and growth.

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The *ovum* and *spermule* have thus as much that is specific and individual, have as much individuality and personality, so to speak, as the animals from which they sprang. In races of fixed type, we can calculate with as much certainty that these little masses of protoplasm will produce a particular texture of bone, prominence of bony ridge, turn of horn, or length and fineness of wool, as if the future animal already stood before us.

Fecundity and Barrenness.—Sterility in breeding animals arises from various causes, some of which I will now enumerate.

Females not used for breeding until old are often difficult to impregnate, and to obviate this danger, as well as to secure an early yield of milk, heifers are too often put to the bull at one year old. Your abortion reports have already shown the danger of this practice, which, besides securing the impregnation of an imperfect *ovum*, insures that the product shall be still further weakened by the deficient nourishment supplied by an immature animal, whose whole energies are demanded for its individual growth. In the second pregnancy the state of things is still worse, as the growing animal has to nourish a fœtus in the womb, and supply as much milk as the udder can be made to yield. When this sort of thing continues for generations, every succeeding one being weaker than the last, and producing young weak like itself, but still further reduced in stamina by the action of the same causes, it is no wonder that, in the long run, breeding becomes very uncertain, from a sensible increase of abortions and other troubles. This practice, with heifers to be used for the dairy, cannot be too strongly condemned, though it may be resorted to in very forward short-horns, provided that the feeding is abundant, and that the heifer is not milked the following summer, the calf born being raised on the milk of another cow.

Plethora sometimes causes barrenness in the female. The over-excitement of the generative organs, the active contractions of the womb, and the profuse secretion from its surface leading to the ejection of the semen after connection. This is often remedied by bleeding before putting to the male, though a dose of laxative medicine and a spare diet for some time before the recurrence of heat would be preferable.

Undue excitement of the generative organs, may exist independently of plethora, and prevent conception. This may be remedied by withholding the male until the heat is passing off, and the excitement greatly moderated, and the seminal fluid is more likely to be retained.

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Obesity with fatty degeneration of the ovaries and Fallopian tubes is a common cause of barrenness in improved breeds of cattle, sheep, and pigs. Here the ovaries are incapable of developing the *ova* or the fallopian tubes of conveying it to the womb. In its early stages this may often be obviated by a restricted diet and abundant exercise, though if the disease is extensive and of old standing, recovery can scarcely be hoped for. An instance of such recovery is seen in the cow "Dodona," condemned at Lord Spencer's as barren, sold cheap to Jonas Webb, and traveled 120 miles to his farm at Wilbraham, soon after which she fell in calf.

Other *diseases of the ovary* destroy its proper function and cause sterility. Cystic disease, or tubercle in the ovary gives rise to a chronic sexual excitement, causing the animal to appear constantly in heat though incapable of impregnation. Some cows affected in this way are even unfit for feeding until spayed.

Admitting the male too soon after parturition may prevent conception. The activity and vitality of the *spermatozoa* are destroyed by contact with the purulent discharges from the irritated surface and fail to impregnate. Hence the practice of putting mares to the horse two or three days after foaling is highly objectionable. It has the additional objection of occasionally inducing an eruption on the yard which unfits the horse for use for the time. If any such discharge from the womb exists, this should first be corrected by astringent injections, and only after recovery should the male be admitted.

Sometimes the neck of the womb is closed, either temporarily by spasm, or permanently by induration. If from spasm, it may usually be overcome by introducing the hand, with the fingers and thumb united in the form of a cone, just before putting to the male. If a chronic induration, it must be counteracted by incision with a guarded knife, and subsequent dilatation with sponge tents until the wounds have healed.

Barrenness sometimes results from too close breeding, but of this I will have to speak later.

Lastly, certain kinds of food impair the fruitfulness of stock. Ergoted grasses, and smutty wheat and corn, cause wide spread abortions. Improper food which causes indigestions, colics, and disorders of the urinary organs, has a similar effect. Food very rich in sugar also hinders conception probably by causing fatty degeneration.

The *male*, as well as the female, may be injured by breeding at too early an age, by excessive use, by overfeeding, and fatty degeneration of the testicles, or by feeding on aliments too rich in sugar. Too

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frequent use prevents the full development of the spermatozoa, the liquid discharged being destitute of these, and probably only supplied by the other glands along the course of the excretory duct. One connection with the female is amply sufficient if there is no obstruction to the entrance of the semen, and a repetition is only a waste of the masculine powers. In desperate cases, it may be advisable to have the act repeated, but if so, it should not be more than twenty-four hours after the first, lest the resulting excitement should cause the loss of an ovum already fertilized. The number of females put to a single male must vary with the species and the personal qualities of the animal. His own disposition and readiness will usually be the best guide as to fitness.

The breeding animal, male or female, should be of adult age, well fed and moderately exercised. In other words, the most vigorous health is desirable in breeding animals. Not only will strong and well fed parents have a better and more vigorous offspring, but they are more prolific. I have repeatedly seen two flocks of ewes, one in high, the other in low condition, put to the same ram, kept on the same pasture, and treated alike; yet at lambing time the well conditioned flock had one-third more lambs to the same number than had the poor one. Good condition must, however, be distinguished from obesity. Accumulation of fat, as we have seen, tends to sterility.

A male may be incapacitated for breeding by the testicles being retained in the abdomen. This is true of man and quadruped alike; the semen, in all such cases examined, having been destitute of spermatozoa and unfit to procreate. Inflammation of the testicle or of its excretory ducts frequently leads to permanent changes, which prevent elaboration or discharge of the semen. Lastly, the deposit in the testicle of glanderous, cancerous, melanotic or tuberculous matter unfits it for elaborating the fertilizing fluid. Other conditions of the male unfit him for use by causing pain during connection and leading him to avoid the act. Among them are eruptions or ulcers on the yard, sprains or other injuries to the back or loins, sprains of the hips, spavins, etc.

Improvement of animals by breeding.—To turn to the science of breeding as affecting the quality of the offspring, we are at once confronted by the fundamental law, "like produces like." If we view wild races or those whose type has long been fixed, this law appears to be invariable; in color, form, gait, courage, and habits, the progeny are the counterpart of the parents. Just as the oak produces oaks, and all the different varieties of oak beget the same kinds, so does the

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germ of a sheep produce a sheep, Leicester, Cotswold, Southdown or Merino, according to the race of its parent.

But this law is true of the qualities of the individual parents as much as of those of the race. An excellent example of this is furnished in the *Ancon* ram, the parent of his race, which was born with short legs and a long, heavy body, and whose descendants rarely, if ever, failed to breed true to the paternal type. Another is had in Colling's bull Hubback, which has so influenced the breed of Short-horns that he may justly be called the father of the race. Some of the earlier English thoroughbred stallions transmitted their personal properties to their offspring in an equal degree. Eclipse, who gained in prizes above £25,000 in seventeen months, and brought enormous sums for his services as a stallion, left among his offspring 334 winners, which brought their owners £160,000, besides cups and plates. King Herod got 497 winners, which brought their owners £201,505.

Law of variation.—This hereditary transmission of personal properties is of great importance in maintaining a breed at a standard of excellence already attained; but it is manifest that without variations no greater excellence could be attained. Without variations the paragons I have just mentioned had been themselves impossible. The bull Hubback could not have excelled his ancestors, nor could the last prize Short-horn have made any advances on Hubback. But though the general characters are transmitted, *the offspring is never the exact counterpart of the parent.* No two animals are exactly alike.

"No being on this earthly ball
Is like another all in all."

It becomes, therefore, quite as important to study the *laws of variation* as the *laws of hereditary transmission.* In controlling these we find the secret of all improvement in breeds. The selection of animals for breeding purposes which show variations of a desirable kind, and the rejection of those which show the opposite characteristics, will go far to effect this object, as the majority of the offspring will usually show the same personal qualities with their parents. But we can go one step further and investigate, ascertain and avail ourselves of many of the *causes of variation.* Among these may be mentioned *food, climate, soil, use, disuse, reversion or breeding back, prepotency of race, imagination of the mother, the influence of a former pregnancy, disease, and accident. High feeding* tends directly to variation and improvement. Wild animals not only decrease in number on a limited supply of food, but the survivors are dwarfed. So in domestication, a liberal diet is essential to excellence and advancement. The English

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racer is allowed a quartern of oats daily at a month old, and the amount is steadily increased with his growth. In poor countries, on the other hand, and where the animals are not highly fed, the race of horses is dwarfed, as seen in the horses of Norway, Sweden, Iceland, Shetland, Brittany and Corsica. Nor is this effect confined to the horse. Cattle and sheep are equally degraded in these localities. On the other hand, we see the foundation of our Short-horns in the rich pastures of the Northumberland estates, where the race was bred for a couple of centuries before Charles Colling began his process of selection. So with our Leicester and Cotswold sheep, and our Essex and Berkshire swine, which were each started on their career of improvement by the native abundance of their respective birthplaces.

A curious instance of degradation or reversion from diminished nutrition is mentioned by Nathusius. A pure Berkshire pig contracted at two months old a disease of the digestive organs, which permanently interfered with digestion. It was kept till nineteen months old, but in place of assuming the Berkshire form it reverted to the wild boar type. It acquired a long narrow head of large size relatively to its small body, and very long legs. Pigs run wild on the barren Falkland islands, have also reverted to the type of the wild boar, but they retain their improved characters on the rich lands of the La Plata. In short, unless on the richest soils, the extreme excellence of our most advanced breed can only be maintained by a stimulating artificial diet.

The influence of *soil* is closely connected with that of food. Soils rich in mineral and organic matter grow the best food, and have supported the most valuable stock. Soils deficient in phosphates and lime cannot supply the requisite material for the bones of large sized breeds, and these can only be sustained on such soils by a liberal addition of highly phosphatic food. Short-horns have been found to degenerate rapidly on some of the poorer sandy soils of Massachusetts, and Mr. Thorne sold his Dutchess county herd ostensibly because of the deficiency of lime in the soil. On the calcareous soils of New York, on the other hand, and on the blue grass lands of Kentucky, this breed maintains its highest qualities without extra effort.

A damp undrained or marshy soil begets thickness and coarseness of the integument and hairy covering, a laxity of fibre and tissue generally, and a phlegmatic constitution, qualities above all objectionable in the horse.

Climate is scarcely less potent. Some animals are more susceptible to it than others, and particular races are affected in different ways.

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For the horse, a dry soil and climate are most conducive to excellence. The cradle of our best breeds is to be sought in northern Africa, Arabia, and Persia, lands famed for the dryness of their soil and the clearness and absence of moisture from their atmosphere. In moist climates, on the other hand, such as that of the plains of Hindostan, Pegu, Ava, Malabar, the eastern Archipelago, and a great part of China, the horse is small and inferior. Horses run wild over the wet stormy Falkland islands have degenerated into an inferior stamp of pony in a very short time, and the Belgian horse, and those of moist climates generally, have become soft, heavy, and lymphatic, destitute of the close texture of bone, sinew, and muscle, and wanting in nerve and vigor.

Booth cattle removed to Ireland lost that mellowness of hide and delicacy of hair for which they are remarkable. Sheep, in warm climates and seasons, have their woolly covering replaced by hair, as in the case of the *ovis montana* of North America. Dr. Nicholson reports that European sheep in Antigua, after the third generation, lose all the wool except over the loins, the animal then resembling a goat with a dirty door-mat on its back. The wool is found to degenerate in some parts of England even, and a high excellence can only be maintained by weeding out the animals whose fleeces are degenerating.

But such superficial varieties are only indicative of other and more radical changes. The forcing system to which it is found necessary to subject our best Short-horns, consists not merely in high feeding, but in maintaining, by artificial means, a mild and stimulating climate in warm buildings. In some respects this may enervate the animals, but without it we could not hope for extreme excellence in early maturity, and in assimilating and fattening qualities. So with the advanced breeds of sheep, of horses, of swine. A certain amount of exposure is incompatible with high excellence. In many cases it is impossible to acclimatize these superior breeds in exposed localities. Attempts to breed high class Leicesters on the Scotch Lammermoor hills, and on some exposed parts of Yorkshire had to be abandoned, because of their deterioration, or their liability to pleurisy. Again, sheep brought from the tropics to the zoological gardens, London, invariably died of consumption under two years after their arrival.

Increased use of Parts.—There is no more constant physiological law than that all healthy parts are developed in proportion to the exercise demanded of them, provided the effort comes short of exhaustion. The blacksmith's sinewy arm, and the mountaineer's

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brawny leg, are familiar examples of this truth. If one kidney is destroyed, the other, taking on its function, is increased to double its former size. The deaf man acquires a more acute sense of vision from its greater exercise, while the blind man has his hearing and touch developed to an extraordinary acuteness. The honest hand of the son of toil and the knees of the camel have the cuticle thickened by the constant attrition. The digestive canal of the domestic cat and pig are more capacious, relatively to the animal's size, than are those of their wild ancestry.

The increased nutrition and growth in all such cases is directly referrable to the more active circulation superinduced in the different organs by their increased action. The same cause operates in producing the excess of muscle and other elements of the locomotive system in the horse, and in increasing his nerve, vigor, endurance and wind. So in cattle, the constant tax on the udder causes it to enlarge and yield more milk, the drying up of this secretion, the rich feeding, the want of exercise, and the quiet breathing, stimulate to the deposition of fat.

The disuse of parts has results of a character diametrically opposite. The arm tied in a sling shrivels, the paralyzed muscle wastes; the cow which loses her calf, or from other causes is not milked, has the udder small and inactive; the ears of domestic animals tend to be pendant, while those of the wild, which must exercise them for self-protection, are always erect; the leg bones of domesticated rabbits become shorter, relatively to the size of the body, than those of the wild.

These exaggerated examples are but indices of important results in breeding. We might, by disuse, have our horses degenerate in bone and sinew, in wind, nerve and vigor; our Ayrshires become poor milkers, or our meat-makers comparatively valueless for the butcher.

Atavism, reversion, or breeding back, is another and troublesome cause of variation. Its operation is seen every day around us. A child resembles not its own parents, but its grandparents, great-grandparents, or more remote ancestors, alike in form, features and habits. The Galloway, Suffolk and Angus cattle, which have been black and hornless for 100 or 150 years, occasionally produce a brown or white calf which grows horns. A Short-horn calf is now and then dropped, in the best preserved herds, with a black nose. Pure Southdown rams occasionally grow horns, while Leicesters sometimes have gray or dun faces. Black lambs are at times dropped in the most carefully preserved white flocks, and classic writers refer to the aboriginal

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Spanish sheep as black. The donkey often acquires leg stripes like his primogenitor, the *asinus tæniopus* of Abyssinia. The horse occasionally shows shoulder and back stripes like the wild horse of Tartary, which probably represents the parent of our common breeds.

Though such reversion will occur without apparent cause, it is more frequently induced by some change in the conditions of life. The pig of Nathusius may be taken as an illustration of this; also the instances of animals allowed to run wild having reverted to their original type. The swine that have run wild in Jamaica, in New Grenada, and in the Zambesi, produce young with the body longitudinally striped, after the manner of the wild European and Indian hogs. Horses, run wild on the Pampas, have acquired the large head, long ears, thick muscular limbs and unsymmetrical body of the wild horse of Tartary.

Violent crossing between two races of strongly fixed types also tends to reversion. The cross between the thoroughly tamed humped cattle of India and English breeds was very wild and intractable. The same was true of the progeny of a tamed wild boar and a Chinese pig. A very remarkable reversion in color was observed in lambs, the result of a cross between some white Southdown ewes and a white Spanish ram with two small black spots on his sides, the property of the Rev. W. D. Fox. All the thirteen lambs were perfectly black. A cross between the Spanish and the Leicester was also black, while the progeny of the Spanish sheep with their own race was spotted.

A similar result followed the crossing of some red Highland cows with Short-horn bulls, colored red, red and white, and dark roan. A considerable portion of the offspring was white, or white with red ears, the constant color of the aboriginal British cattle kept in the Chillingham and Hamilton parks. The breeder is sometimes disappointed in the worthless produce of two animals of different breeds, but both of good milking qualities. He may find the explanation in this tendency of a violent cross to cause reversion to an aboriginal type, in which no more milk is produced than is necessary to support the calf.

Violent crosses and violent changes in the conditions of life are thus to be adopted with caution until it is seen that the breed is not likely to deteriorate under their influence. Against the many other instances of reversion without apparent cause, we must provide mainly by discarding the subjects of it as unfit to perpetuate an improved breed.

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Prepotency.—Some animals and breeds transmit their own peculiar properties with greater force than others, so that when crossed they will confer upon the progeny more than their own due share of personal qualities. This has been called prepotency. It is mainly due to a breed having been bred in a particular strain, and without any circumstances to cause variation for a great length of time. Hence it is strongly inherent in all old and pure native breeds, and scarcely less so in our various improved breeds, whose characters have been carefully selected and bred in for a century or more. Breeds recently formed, on the other hand, and animals, the produce of indiscriminate crossing, possess this power in a very limited degree.

The most extraordinary instance of prepotency on record is reported by Fleischmann. A German breed of sheep, with but 5,500 fibres of coarse wool on the square inch, was bred into the Merinos for twenty generations, with this effect: The third or fourth Merino cross had about 8,000 fibres of wool on the square inch, and the twentieth cross but 27,000, whereas the pure Merino had 40,000 to 48,000. After breeding back into the Merino for twenty generations, when but one-millionth of the German blood was left, the wool was barely half restored to the quality of the Merino. Godin mentions the instance of a goat-like African ram which crossed with Merinos, had lambs closely resembling himself; but here the prepotency ended, as the lambs crossed with Merinos at once passed to the fine wooled type. Here the power seems confined to the individual and intransmissible, and in crosses this is the tendency; but in breeding with the same or a closely allied family the prepotency is retained in the offspring. Thus the Short-horn bull Favorite, like his predecessor, Hubback, contributed enormously to fix the present quality of the breed; and among horses King Herod, Matchem and Eclipse have very largely contributed to form the present race of thoroughbreds.

But prepotency is less frequently the prerogative of the individual than of the breed which has been bred long and carefully to a particular type. Hence the great value of our Short-horns and other pure races in imparting to other breeds, with which they may be crossed, their own qualities to a proportionately greater extent than the share they have had in begetting them. This prepotency bred into our best herds enables us to raise other breeds to their own standard more rapidly than could otherwise be expected.

This brings us to the general subject of *cross breeding*. Its advantages and disadvantages may be adduced from what I have already said. Crossing a pure, well fixed breed with one whose characters

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are less fixed and constant, will bring the impure breed very quickly to the standard of the pure, and this will be a change for the better or the worse, according as this pure breed excels or comes below the other in personal qualities. Thus breeding our common cows with a poor aboriginal race of any country will deteriorate them rapidly, while crossing them with Short-horns, Ayrshires or Dutch will with equal rapidity improve them. Again, crossing of these improved breeds with a poor but strongly fixed and prepotent breed will be at the risk of obtaining a reversion to a more primitive and still poorer type of the race. Crossing thus becomes an art, whose principles must be studied and acted on in order to success. Intelligently employed, it is an arm of power for raising our poorer breeds to a higher standard. Ignorantly or carelessly followed, it may rapidly degrade those splendid races whose perfection has been the work of centuries.

A first cross has often more substance than either of the parents; hence it is often resorted to with profit to raise animals for killing. The power of transmitting their personal qualities is, however, diminished; hence they readily degenerate if bred among themselves or with a breed poorer, but with more fixed characters.

Close breeding has been much lauded and detracted, and perhaps with about equal justice. A resort to it is almost always necessary to obtaining the highest excellence in a breed, as the qualities desired are met in but one animal, which must accordingly be bred to his own progeny until his excellencies are in some measure fixed. All our improved breeds have been formed in this way. That such close breeding is also a fruitful source of constitutional weakness, of the increased potency of hereditary and constitutional diseases, and of sterility, is no less true. To this effect agree the observations of Seebright, Knight, Prosper Lucas, Wright, Fox, Druce, Fisher Hobbs, Jonas Webb, Nathusius, Youatt, Low, Darwin, MacKnight, Madden, Spooner and others. Mr. Bates, so celebrated in connection with his strain of Short-horns, says that "to breed in and from a bad stock is ruin and devastation, yet that the practice may be safely followed within certain limits when the parents so related are descended from first class animals." This merely amounts to the statement that by a careful selection the evil day may be put further off. A few instances of injury from *close breeding* may be worth repeating. The Seebright bantams were very bad breeders. Bakewell's Long-horns "had acquired a delicacy of constitution inconsistent with common management." The ancient British white cattle in Chillingham park have but one calf yearly to five of the stock, and those of the Duke of Ham-

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ilton but one to six. Jonas Webb found it needful to keep five different families of sheep to draw upon, thus "retaining the requisite distance of relationship between the sexes." Lord Western imported a Neapolitan boar and sow, and bred them in and in till they threatened to become extinct, when a cross with an an old Essex boar restored to fruitfulness and laid the foundation of the improved Essex breed. Mr. Wright bred from a boar and seven successive generations of his female progeny; but in the end most of the offspring were too weak to live, others could not suck without assistance, and few of the survivors bred. The general appearance of the race improved, and the best sow of all was in the seventh generation; but there was no other in the litter. She would not breed to her own sire, but did so on the first attempt to a stranger in blood. Nathusius imported from England a pregnant Yorkshire sow and bred the progeny closely for three generations at the expense of a steadily decreasing fertility. One of the last sows, a very superior animal, bred to her own uncle (who was quite fertile with other breeds) two successive litters of six and five poor weakly pigs. Paired with a small, black English boar (which produced litters of seven to nine with his own breed), she had twenty in the first litter and eighteen in the second. Mr. Cogswell, Gilmington Iron Works, N. H., bred together Chester pigs of the same litter. Out of fifteen pigs five were cripples, and of the remainder one-half could not be fattened. Mr. Rossiter, Milford, N. H., had a large Irish ewe, and in order to perpetuate her good qualities bred her to her own son. The first lamb, being unable to support himself on his limbs, was destroyed. A second lamb to her son was with some difficulty raised; but, to use the expressive language of the owner, "was a fool."

The condition of the pigs to which I have referred was rather a sexual incompatibility than barrenness; but the distortions and weakness of other cases too clearly show the evil effects of very close breeding when persisted in. In some strains of Short-horns and of Cotswold sheep the close breeding has intensified consumption and rheumatism, and Lafosse mentions a herd of blind Brittany horses in which periodic ophthalmia had been aggravated to this extent by *in and in breeding.*

All of these evil effects may be obviated, however, by introducing at intervals blood of the same breed, but of a different branch of the family, which has been bred apart for several generations, and if possible on other soil and exposure. We can thus secure all the good of close breeding, and at the same time avoid its dangers.

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Disease and accident.—That many diseases are hereditary is notorious to all. Those with a constitutional taint are above all transmissible. Thus rheumatism, consumption, scrofula and cancer run in certain families, human and brute. In the horse we have the recurring inflammation of the eyes; certain affections of bones and joints, from bad conformation or faulty nutrition; heaves, with a want of chest capacity; and roaring from badly set-on head and narrowness between the branches of the lower jaw.

But independently of constitutional taint or bad conformation, changes of structure caused by accident or disease are often transmitted. This is more likely to be the case if the disease exists during gestation, or if it persists in the seat whence a part has been removed. A Clydesdale mare at Spott, Scotland, had her two fore feet so small that she could do little work, but was thought good enough for breeding. Of her four foals, two had feet so small and weak that they would scarcely hold the shoes, and went constantly lame. The other two had feet apparently well formed, but were utterly ruined at an early age by founder. A mare of Mr. S. Scott's, Dryden, N. Y., suffered during pregnancy from a severe inflammation of the left eye, supposed to have been caused by a burdock in the forelock. She produced a filly with the left eye undeveloped., and represented only by a small round black object. After foaling, the mare recovered, and has since borne several colts with sound eyes. The filly, now nine years old, has also had several foals, all with perfect vision. Here the suffering during gestation seems to have determined the loss of the organ, and the same cause often leads to the perpetuation of splints, spavins, ringbones, sidebones, navicular disease, and other causes of lameness in the offspring. A similar instance is presented in the cow which had her horn knocked off and a severe suppuration in the place, and which had afterward three calves hornless on the same side of the head.

But the simple absence of an organ, without persisting disease, is sometimes perpetuated. Cats, dogs and even horses, which have lost their tails by accident, have afterward borne young devoid of this useful appendix.

On the whole, it is better never to breed from an animal imperfect from disease or accident, but this caution is still more imperative if the disease persists at the time of conception, and above all, if associated with a constitutional taint. If consumption, scrofula, rheumatism, or other similar disease, exists in the family in a strongly marked

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form, no member of it ought to be used for breeding, no matter how sound he may appear to be personally.

Imagination.—Strong mental impressions experienced by the pregnant female are often reproduced in the offspring. Jacob was enriched, at the expense of his unjust father-in-law, by the operation of this law, divinely strengthened, it may be, by the overruling hand of a just God. An instance very analogous happened in the Sittyton herd of Short-horns. These were all roan and red, and never produced more than one, or at most two, white calves in a season, and these were always removed from the herd; but in 1849 the steading was whitewashed to ward off the approaching pleuro-pneumonia, and in that year twelve white calves were produced. In the same year whitewashing had a similar effect in a Yorkshire herd of short-horns. Mr. George, Barnstaple N. H., had a native red and white cow, sired by a native bull of the same colors, but which was frightened about the same time by a black and white Dutch bull, the only animal of the kind in the locality, and had in due time a black and white calf. Mr. P. M. Rossiter, Milford, N. H., had a cow die in calving, which was skinned where she lay, in full view of another pregnant cow. This last cow, in due time, had a calf, without hoofs, or skin on the hock joints, and with skinless lines inside the limbs, where usually slit up by the butcher in skinning.

In many cases the close association or intimacy of the pregnant female with animals having peculiar traits, has led to the reproduction of these traits in the offspring. Dr. Trail, Monymusk, Aberdeen, reports that a mare worked, stabled and grazed with a black gelding having white legs and face, straight hocks and hoofs set on the long pasterns at right angles almost. Covered by a stallion like herself (bay with black legs and white star in the forehead), this mare had a foal exactly resembling the gelding in color and shape, and above all, in the distortion of the hind legs.

Mr. Mustard, Forfar, had a pure black polled Angus cow grazing with a horned white ox, with black spots, for some time before being taken to a pure Angus bull. Her calf was black and white and grew horns. In 1848, Mr. McCombie, Tillyfour, sent one of his polled Angus cows to graze on a bare pasture with a large yellow and white spotted ox, whose colors her subsequent calf, by a pure Angus bull, exactly reproduced. Col. Bryant, Fairhaven, Mass., reports that a number of black cows, sent to an island in Buzzard Bay to avoid evil influences, had by accident a dun steer introduced among them, and, much to his disappointment, the owner had a herd of calves, without

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exception, of a dun color. Some breeders of Angus cattle are so sensible of this danger, that they will admit no animal to their farms, not even poultry, unless they possess the orthodox black color.

A few years ago a fine mare of Mr. McGraw's, Ithaca, N. Y., served by a horse of equally good parts, was allowed to graze during pregnancy in a park adjoining one occupied by a mule, and the foal presented unmistakable mulish traits in head, ears, neck and thighs.

Other instances of the same kind might be mentioned, but let these suffice to illustrate how carefully we should guard improved races against ignoble or degrading associations, and very striking or novel conditions of surrounding things.

Effect of a first pregnancy on succeeding ones.—Closely allied to the effects of imagination is the influence exerted by the product of the first pregnancy on succeeding ones. All have heard of Lord Morton's Arab mare, which bred a foal to a quagga, and afterward two successive foals to an Arab horse, both of which showed the dun color, the leg stripes and the bristly mane of the quagga. A fourth foal, bred three years later, still bore marks of the quagga. Haller and Becker long ago noticed the same tendency in a mare which had once borne a mule; and without any such violent cross, the first stallion often gives the character of subsequent offspring. Thus a number of foals at Hampton Court, sired by Actæon, bore a strong resemblance to Colonel, by whom their dams had been served the previous pregnancy.

Mr. McGillivary reports the case of two Angus cows served once by horned bulls, and which, next pregnancy, by pure Angus bulls, bore cross calves that grew horns. Dr. Wells, Grenada, crossed a small flock of white woolly ewes with a hairy, chocolate colored ram, and though they were served the following season by a ram of their own breed, the lambs partook of the color and hairy covering of the first ram. Mr. Harry Shaw, Leochel-Cushnie, Aberdeen, had six horned black-faced ewes put, some to a Leicester and some to a Southdown ram, both hornless; and the following year, though served by a horned, black-faced ram, the lambs were dun-faced and polled.

Among swine the same holds good. Mr. Giles put a black and white Essex sow (Lord Western's breed), to a wild boar of a deep chestnut color, and, long after this boar was dead, had her served by a black and white boar of her own breed, in which the chestnut shade was never seen; but the pigs showed plainly the chesnut coloring.

In dogs this tendency is every day seen; and, according to Dr.

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Chapuis, even in pigeons the first male affects the characters of the progeny by other future males.

If this statement of Dr. Chapuis' is corroborated, the only rational explanation of the curious fact, is that it is purely a result of the mother's imagination. If not, the hypotheses of the tainting of the mother's blood, and of the influence of the embryo in the womb on the development of ova then in process of growth, may still be sustained by plausible reasoning. But whatever the true explanation, the fact is the same, and stands out as a warning to the breeder against crossing his noble races with a male of inferior blood, if he wishes afterward to obtain pure stock from the same dams.

The respective influences of the male and female parent on the progeny it is of much importance to the breeder to understand. Buffon and Flourens long ago drew attention to the frequency with which the locomotive organs, above all, of the anterior part of the body, the skin, the temper and vigor resemble the male parent, and the constitution and internal organs the female. Mr. Orton improved on this theory, attributing the whole locomotive organs to the male, and asserting that the law as thus amended was constant. He saw that the mule resembled his donkey sire in color, hair, mane, tail, feet and limbs, while he had the size, strength and constitutional vigor of the mare. That on the other hand, the hinny resembled its horse parent in color, mane, tail and feet, but had the size, constitution and sluggishness of its donkey mother. That a cross between a hemione and a she ass, in the *Jardin des Plantes*, had the skin and outward appearance of the sire, even to the graceful head, the ears, eyes, nostrils, neck, croup, tail and feet. Buffon's crosses between the he goat and ewe had the tawny, hairy coat of the goat. Flourens' hybrids between the jackal and the bitch had the fine fur of the jackal. Dr. Wilson's crosses of common cats by a Manx *tom* had no tail in seventeen cases out of twenty. Those between a common *tom* and Manx cats had all tails, though short ones. In Mr. Orton's crosses of a silk cock with bantam hens, out of many, there were three with silky feathers; but a Spanish cock breeding with silk hens never had silk chickens. Rams are currently believed to contribute more to the quality of the fleece than ewes. These are strong facts, and many breeders have relied on the constancy of the law in seeking the improvement of their stock. Mr. Booth is understood to have acted on this hypothesis in producing his celebrated strain of Short-horns.

But after giving all due importance to those facts observed in crossing, it must be acknowledged that the results are by no means so

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apparent in breeding between individuals of the same species or family. In such cases, for example, color appears to be as often the gift of the female as of the male. Hartmann justly says that the foal of a horse and mare of different colors resembles the dam quite as frequently as the sire. In a litter of dogs or cats, some resemble the male and some the female parent, or the colors of the two are mingled. This mixing of colors is often seen in calves, and it is noticeable that the offspring of white with gray mice have an intermediate shade.

The problem would seem to be best solved by adopting an intermediate position, by accepting Mr. Orton's theory with some reservation as applied to violent crosses, while we admit it to a very limited extent only, with reference to animals of the same species, and above all of the same family or strain. It will further be often modified by the varying individual health and vigor and prepotency of the different animals coupled together. After making all reservations, however, there still appears to be sufficient truth in the theory to put us on our guard against breeding from males faulty in form, in energy, or in their locomotive organs, and from females deficient in constitutional vigor, or with any defect or tendency to disease of their internal organs. The remaining personal excellencies must be unusually great which would warrant us in breeding from *any diseased* or *very faulty* animal, but above all we should avoid defects and diseases of the parts ascribed to the particular parent.

I trust that no one will suppose that I have exhausted the causes of variation in my preceding remarks. Some, no doubt, remain which are partially known and which might be enumerated, others are still hidden from mortal ken. I have aimed at presenting and illustrating the most common and the most potent of those causes in order that, by familiarizing the mind with them, we may not only avoid the dangers which beset the path of the breeder and save ourselves from the ruin of a valuable breed and great pecuniary loss, but be enabled to control and direct these laws in raising our farm stock to a higher status, and confer a lasting benefit on the human race. Here, as in all the avocations of life, *true knowledge is power*. As the destructive lightning in the hands of a Benjamin Franklin becomes our swift messenger to flash our words across the trackless ocean; as the deadly choke-damp in the hands of the chemist resigns itself to be conducted into our halls and parlors, to kindle the glowing cheek and fiery eye, to add lustre to all, to stir every pulse, and to gladden every heart; so may these laws of the Creator, which to the uninstructed have been

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too often a mysterious source of trouble and loss, be wielded by human hands for the amelioration of our flocks and herds, for the aggrandizement of our country's wealth, and for the material good of humanity.

It is only demanded of us that we, practically and with the greatest care, apply the laws of reproduction already discovered to us, and that we be carefully observant of new facts which may tend to throw more light on this important and interesting subject; that we secure for our stock those influences of food, soil and shelter or climate which lie at the foundation of all excellence; that we call forth to the utmost, by constant use, the development of those parts, functions and powers which are mainly desirable in the race, and allow all undesirable properties or organs to lie dormant and to waste; that, in *crossing*, we pay due regard to the relative strength of type or *prepotency* of the different parents, to guard against breeding more to the lower race, or to a primitive race far inferior to either, and to secure that the *prepotency* being with the better race shall sway the offspring mainly in that direction; also, that cross-bred animals be not bred with inferior races lest their diminished *prepotency* lead to a rapid degradation; that *close breeding* be modified at intervals by introducing blood which has been kept apart for several generations and in different conditions of life; that animals subject to disease or serious defect be rejected for breeding, above all if the disease is associated with an hereditary constitutional taint, or if it exist in the parent at the time of conception, and that disease and defects of the locomotive system in the male, or of the internal organs of the female, are above all to be rejected; that intimate association with an inferior stamp of animal, and sudden and startling changes in the appearance of surrounding objects, must be rigidly avoided with pure bred animals lest they affect the progeny; and that no pure bred female should be put to a low bred male, if she is wanted afterward to breed pure stock.

And in seeking to avail ourselves of the laws I have set forth, particular attention is required. The laws themselves are unchangeable, though they may in some extraordinary cases be overturned by the intervention of others, of which we are still ignorant. When this occurs, and when a particular product fails to come up to our expectations, we are compelled to weed it out, that we may preserve the excellence of the herd. For though such product might, in the main, breed back to his parent stock, yet his own personal defects would be reproduced to a great extent in his progeny, and deviations from the more perfect standard would thus become increasingly frequent. Again, we

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should endeavor to have the breeding animals, at the time of conception, up to the highest activity and development of those qualities which we desire to perpetuate. It is not enough that an animal has been good, she must be so when put to the male. The mare whose wind has been impaired by chest disease, her pace by sprains, spavins, and ringbones, and her vigor and energy by the constant depression attendant on old age, and chronic ailments, will fail to produce a foal with the surpassing excellencies which she may have shown in her youth. The Ayrshire, in poor health and with the udder dry and shrunken, will have a much less valuable progeny than one which conceives in the full vigor of health and the abundant flow of milk. We have seen that the *ovum* and *spermatozoon* reproduces not only the race, but the individual animal from which it sprang, and with the properties and powers which it possessed at the period of the development of the germ. Not only should our breeding animals be as nearly as possible perfect, but we should strive to have their peculiar excellencies in a state of the greatest possible activity at the time of conception, so that we may intensify those traits in the offspring. The desert Arab seems alive to the value of this principle, for he gallops his mare to draw out all her fire and mettle before putting her to the horse, and whether the result is as great as he imagines, or not, there can be no doubt of the truth of the principle.

The general effect of many of the laws which I have mentioned may often seem almost imperceptible in a single generation; but if slow, the ameliorating action is none the less sure, operating successively on parent, on germ, on embryo, on the young animal progressing toward maturity, and on the full grown individual; so that the germ of the next succeeding generation starts on a higher plane, with greater power of self-elevation, and with brighter prospects, and it seems almost to partake of temerity to seek to limit the possibilities of improvement. As the mountain torrent first washes away the surface soil, and then day by day, through long cycles of ages, cuts its way into the solid rock, excavating the deep and yawning gorge, so with the laws of nature in general; they are slow in working out their results, but they work none the less surely; and though we may not stay the hand of Him who works, yet he has graciously placed it in our power to control somewhat the course and energy of the operations, and to become co-workers with Him in the great field of beneficence.

The operation of the laws of reproduction upon the wild races has had the effect of maintaining that admirable harmony and fitness of

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things which led the Creator, in view of his completed work, to pronounce it good. The unproductive soils develop animals few and small; the constant rooting for his food begets the powerful jaws and neck of the wild boar; the tropical heat gives the sheep an hairy coat, and the cold and wet atmosphere gives all animals a thicker hide and heavier hair. But in domestication the intelligent care of man is called upon to overcome the unfitness of the locality by extra food, shelter, etc., and he does not mar the harmony of creation, but augments it, in advancing his stock from their native poverty and meanness to a value and beauty more in accordance with the daily wants of civilized man. If the man who makes two blades of grass grow where but one grew before, is worthy of the gratitude of his country, much more worthy is he who will perfect a race of animals that can transform these blades into double the quantity of juicy beef or mutton, and in half the time required by commoner races.

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WOOL AND MUTTON IN AMERICA.

ADDRESS BEFORE THE SOCIETY, AT THE ANNUAL MEETING, WEDNESDAY EVENING, FEBRUARY 8, 1871.

By J. R. Dodge.

In coming before an audience so distinguished for experience in sheep breeding and wool growing, and so thoroughly acquainted with current facts in this department of husbandry, I may not hope to furnish material that is altogether new or absorbingly interesting.

It may not be easy to glean anything valuable from a field so closely fed that scarcely a *bite* has been obtained since the days when so many were bitten by the *Infantado* mania; yet, from some standpoint of elevation affording a birds-eye view of its inequalities, its points of verdure and succulence, its green valleys and still waters, I may properly and, I hope, profitably, gather a few facts and present some suggestions which, if not altogether new, may be true and timely and suggestive of "a dollar or two" of profit yet to be made upon wool.

At the outset I shall oppose the assumption that sheep husbandry cannot be made to pay. There is neither sense nor reason in paying $5,000, $10,000 or $15,000 for a masculine *Infantado* at one time, and incontinently "taking his pelt" at another. An animal that is the main reliance for the food, clothing, and even companionship of the nomadic man, and that is equally indispensable to improved husbandry in its highest estate, cannot safely be discarded from the rural economy of any portion of this continent, whether it be a section of those peculiar and wonderful "desert wastes," where countless herds of buffalo and illimitable areas of antelopes fatten, summer and winter, or the rich and costly acres of the valley of the Mohawk.

I propose, therefore, to ask, and to answer as well as I may, the questions: Why are wool prices depressed? How can sheep hus-

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bandry be made profitable in the future? What breeds should we grow? And where shall each be produced?

CAUSES OF DEPRESSION.

The reasons for the present depression of wool industry are obvious, and yet they do not appear to be well understood by the mass of wool growers. I wonder not that prices are no higher; the wonder naturally should be that our flocks are not altogether banished from the pastures, and the hum of our woolen mills altogether silenced. Among these reasons are: 1. The excessive increase of flocks throughout the world during the war, both on account of our own unusual demands and in the expectation of the prostration of cotton production for an indefinite period. 2. The selling, for a song, of millions of government garments, at the dawning of peace, from military storehouses, 200,000 overcoats being advertised at a few dollars each by a single clothing firm, the quantity so large and the price so low that I have never been able to get the official figures; the recent reply being, "The Secretary of War deems it inexpedient to comply with your request." 3. The immense importations, both of wools and woollens, in anticipation of the tariff, amounting in 1866 to about 70,000,000 pounds, and woollens to the value of $57,115,901, little less than the total imports of four preceding years of the war, which were $87,762,918. 4. The flocks of this country, as of all other wool producing regions, were constantly increasing up to 1867, when cotton prospects began to revive, and the hopes of Australian and Brazilian wool growers to decline, the rate of increase of their flocks to fall away, followed by despondency, the knife, the tallow, and the pelt, and a quitting of the business in disgust. The general despondency here is still further increased in consequence of the instability so characteristic of agricultural enterprise in this country. When wool was one dollar per pound, fine imported rams $5,000 each, and the popular enthusiasm for wool growing wrought up to a fine frenzy, the conviction was strong within me that the next sweep of the pendulum would usher in the era of hide and tallow, and an inexpressible disgust for the business. The enthusiasm was as unwarranted as the despondency is baseless. The result of this despondent feeling is neglect of flocks, scanty supplies of feed, a frozen bite beneath the snow, or shelter and subsistence together in the lee of a straw stack, followed by foot-rot, scab, and all the diseases to which sheep flesh is heir. Is it strange that such sheep masters should report their business unprofitable, as thousands have done during the past three years?

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And yet I could give instances of success, during all this time, sufficient to fill a small volume, not only covering small numbers, but flocks numbering thousands, both in the States and Territories. In these instances, the proprietors were men of sense and grit, who had faith in their business, gave their personal attention to it, cared for their sheep, kept disease and discomfort and starvation far from them, and were rewarded for their persistence and pluck only less liberally than in the flush times of 1864.

Statistics of Production and Consumption.

A momentary glance at the wool production and consumption of the last decade will serve to illustrate the overproduction to which I have alluded. The number of sheep in 1840, as returned by the census, was 19,311,374, shearing 35,802,114 pounds of wool, or 1.84 pounds per head; in 1850, the number was 21,723,220, an increase of twelve per cent, shearing 52,516,959 pounds, or 2.42 pounds per head, an increase in weight of forty-six per cent; in 1860, the increase had been small, approximate free trade in wool having been inaugurated, the number being 22,163,105, their wool 60,511,343 pounds, or 2.73 pounds per head.

I have estimated the wool product of the first half of the past decade, from 1861 to 1865 inclusive, beginning at 55,000,000 and closing with 115,000,000, at an average of 83,000,000 pounds per annum; and for the second period of five years at 130,000,000 per annum. The amount of wool imported has been 504,589,349 pounds, and 41,424,026 pounds of shoddy. Our own production, estimated at 1,065,000,000, added to these imports gives a total of 1,636,000,000, or 161,000,000 per annum as our average home manufacture since 1860, at which date our manufacturers consumed but half of that quantity. Thus, with our greatly increased manufacture, two-thirds of the wool required in this eventful period has been produced at home.

When it is remembered that the aggregate of home and foreign wool was but 50,808,524 pounds in 1840, 71,186,763 in 1850, and 95,098,000 in 1860, it will be seen that the advance in ten years, in the quantity of wool used, as well as in the variety and character of the goods made, has been equal to the sum total of all former achievement.

The aggregate importation of woollens for each decade, and the annual average for each, in the past fifty years, is as follows:

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	Aggregate.	Annual average.
Ten years ending in 1830	$86,182,110	$8,618,211
Ten years ending in 1840	129,336,258	12,933,625
Ten years ending in 1850	109,023,552	10,902,355
Ten years ending in 1860	282,682,830	28,268,283
Ten years ending in 1870	320,340,346	32,034,034
Total in fifty years.....	$927,565,096	

The following statement gives in detail the quantity and value of wools and woollens imported in the past ten years:

YEARS.	Woollens.	Wool.		Cents per pound.
		Pounds.	Value.	
1861.....	$28, 261, 039	36, 000, 000	$4, 961, 326	13.7
1862.....	14, 884, 394	43, 571, 026	6, 994, 606	16.0
1863.....	20, 411, 625	73, 897, 807	12, 553, 931	16.9
1864.....	33, 189, 336	90, 396, 104	15, 923, 991	17.6
1865.....	20, 347, 563	43, 858, 154	7, 728, 383	17.6
1866.....	57, 115, 901	67, 917, 031	9, 381, 083	13.8
1867.....	45, 813, 212	36, 318, 299	5, 915, 178	16.0
1868.....	32, 371, 329	24, 124, 803	3, 792, 659	15.7
1869.....	34, 560, 324	39, 275, 926	5, 600, 958	14.2
1870.....	34, 435, 623	49, 230, 199	6, 743, 350	13.6
Total	$320, 340, 346	504, 589, 349	$79, 595, 465	

The following table shows the quantity and value of shoddy imported in ten years:

YEARS.	Pounds.	Value.	Cents per pound.
1862.....	6, 291, 077	$442, 376	7.0
1863.....	7, 867, 601	561, 284	7.3
1864.....	8, 133, 391	621, 514	7.6
1865.....	4, 863, 064	410, 395	8.4
1866.....	7, 147, 108	589, 490	8.2
1867.....	5, 220, 296	518, 479	9.9
1868.....	556, 414	49, 649	8.9
1869.....	832, 283	68, 108	8.1
1870.....	512, 792	55, 009	10.7
Total.....	41, 424, 026	$3, 336, 249	
Average	4, 602, 669	370, 694	8.0

The increase in production abroad has in many countries been even greater than in the United States. In 1820 Great Britain imported less than 10,000,000 pounds; in ten years more her importation was 32,000,000; in 1840 it had increased to 49,000,000; to 74,000,000 in 1850; to 133,000,000 in 1859; and to 255,000,000 in 1869. Thus the increase of imported wools has been 122,000,000 in ten years in Great Britain, a quantity nearly equal to the present clip of the United States. Australia, in 1840, contributed less than 10,000,000, but

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sent 39,000,000 in 1850, 53,000,000 in 1859, and 158,000,000 in 1869, an advance in ten years of 105,000,000, about 200 per cent. The receipts from South Africa, which were 14,000,000 in 1859, had become 34,000,000 in 1869.

The following is a statement of the British importations of wool, with the sources from which they were derived, in the years 1868 and 1869:

	1868. Pounds.	1869. Pounds.
From Europe	22,267,637	25,199,401
From South Africa	35,993,572	34,307,882
From India	17,602,442	18,796,578
From Australia	155,745,199	158,477,969
From all other countries	19,320,004	18,379,522
Total	250,928,854	255,161,343

In connection with this, I will present the official statement of the number of sheep in the British colonies in the year 1868:

New South Wales	13,909,574
Victoria	9,532,811
South Australia	4,477,445
West Australia	599,756
Queensland	8,921,784
Tasmania	1,742,914
New Zealand	8,409,919
Mauritius	18,057
Natal	286,264
Cape of Good Hope	9,836,065
Total	57,734,589

With these facts in view it will surprise no one that despondency should rest upon sheep husbandry, not alone or chiefly in this country, for wool is to-day bringing higher prices here than in any other portion of the world, but also in Australia, South Africa, South America, and even in Europe. Eighteen months ago the flocks of South America were slaughtered by thousands for their pelts, and the price of an average sheep had declined from two dollars to fifty cents. And the depression is far greater to-day in Australia, where slaughter has also been rife, than in this country.

No man in his senses, and with ordinary intelligence, can fail to see that the tariff of 1867 has been the salvation of our sheep husbandry; salvation from a more complete and remediless overthrow than

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awaited the business at the close of our war with Great Britain a half century ago, when manufacturing was at so low an ebb that in 1820 it only amounted to the value of $4,413,068, and in 1830 produced little more than half its value in 1810, and even in 1840 yielded but $20,696,999, while the product thirty years previously was $25,608,788.

Would it have been wise to have so overthrown our woollen industry that the year 1900 might scarcely have brought it up to its condition in 1860?

How Sheep Husbandry May Pay.

I come to the inquiry, can sheep husbandry be made profitable in the future? I answer, yes. Then how? by what breeds? and where located?

The first requisite is, not that wool growers shall be unduly favored, but that they shall not be discriminated against by the government; that the burden of taxation necessarily resting upon the home producer shall be laid at least with equal weight upon the foreigner, who, in the solitudes of almost savage wastes, avoids all tribute to civilization and government. There should be no premium paid to alien industry. With the exception of the very finest for cloths, a little lustrous combing wool for a class of worsteds, and some of the coarsest for carpets, we already produce all the wool required for consumption, so that every pound introduced for other purposes displaces a pound of our own; and one would imagine that with a continent before us, nine-tenths of which is unutilized by agriculture, containing 100,000,000 acres of herbage, yearly wasted, sufficient at least for 100,000,000 sheep, capable of producing more wool than Great Britain herself is able to consume, the home competition, foreigners being excluded, would reduce prices to a reasonable level, but one remove above that resulting from the competition of the world.

2. Another essential is the utilization of the vast plains beyond the Missouri, the valleys and slopes of the Rocky mountain system, the savannahs of Texas, and the mountains of the south, in the production of merino wool, where uncropped herbage annually decays in sufficient amount to clothe in comfort and elegance every human being on the continent of North America. While the merino can be profitably kept under more varied conditions of rural husbandry than any other sheep, it is especially the breed for the border, the arid plain, the mountain fastness, and the wilderness; it is the nomadic

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member of the ovine family, a great traveler, yet social and gregarious, frugal and thrifty, delighting in the depth of the solitudes, yet never a *solitaire*.

3. Almost equally essential is the introduction of the element of mutton-with-wool into the improved husbandry of the older States, as a link in the chain of a wise rotation, and as an inseparable adjunct of high farming; mutton as the product of large yields of the roots and grasses, obtained in the shortest period of time and in the largest measure of quantity, with wool as a valuable incidental, and manure as a third result of present intrinsic value and still greater economic importance as a productive investment. Few owners of long wool flocks in this country appear to understand practically the difference between the fine wool and long wool husbandry, forgetting that it is the destiny of the merino to be *kept* for wool, of the Leicester to be *killed* for mutton, and holding the mutton sheep, upon barely thriving rations, for the purpose of shearing once in each year. The folly of such a course is like that of a beef producer who should let his animals run in the stock range and expect the results of stall feeding. The mutton breeds, like Short-horn cattle, are simply machines for converting farm products into meats and fertilizers, the production depending upon the regularity and freedom from friction with which the machinery runs, irregular feeding, an occasional scanty supply, undue exposure to cold, or a temperature uncomfortably high, reducing inevitably the amount of flesh produced by neutralizing the nutritive power of a certain quantity of feed. To make mutton with the highest profit every pound of hay, roots or grain fed must yield a fair result in flesh gained. Thus, while wool growing may be successful in the midst of primitive, almost barbaric practices in culture, mutton production involves arts of husbandry the most advanced, and a knowledge of animal physiology the most enlightened. But the full value of mutton making, as a part of a system of farm rotation, cannot be determined with reference to its immediate returns. It has often happened in England, in the yearly reckoning of the farmer, that turnip feeding has made an apparent loss, while the net product of four years' rotation has resulted in a decided profit, which could not be enjoyed in the absence of the fertilizers obtained in the production of meat from grass and roots. It should be remembered that the selling prices of farmers express very inadequately, especially in this country, the difference between the productive capacity of poor and rich soils, as shown by the accumulation of a lifetime of industry and economy.

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A French statesman (Thiers) realizing the influence of sheep husbandry upon agriculture, declares, in full view of the serious competition of Australia and South America, that France cannot afford to dispense with sheep. Neither can the United States. Another means by which sheep husbandry may flourish is found in the market for fat and fine early lambs, which, at three to four months old, command a far higher price than the present average for all the sheep of the country. The average price of sheep, as estimated in February, 1870, was $2.28 each, while the average for really good lambs in all city markets was, in 1870, fully double that sum.

New Jersey, lying between the two largest markets in the country, which feed a population of 2,000,000, is famed for high prices of all feeding material; and yet this branch of sheep husbandry flourishes there as in no other State in the country. Her flocks, consisting mainly of ewes, are yearly changing. Selected in August, for their thriftiness and adaptation to breeding, from flocks driven from Pennsylvania or Ohio, and costing from three dollars to six dollars per head, they are pastured in early autumn, usually served by Southdown rams, fed well during winter, their clips sold early in spring, their lambs turned off in May and June at four dollars to eight dollars each, and the mothers in the meantime fattened to follow their offspring early in summer. Thus within twelve months fleece, lamb and mutton are converted into cash, and from six to ten dollars per head received for feed and care, besides a supply of valuable manure. Here are quick returns and good profits. The breed is the common grade Merino stock of the country, selected with reference to size, thrift and constitution; the lambs are cross-bred, partaking largely of the Southdown superiority in quality and of the aptitude of cross-breds for fattening readily. Both sheep and lambs are disposed of promptly; no feed is wasted in merely keeping the vital machinery in working order, and losses from old age and epizoötics are avoided. This is the predominant feature in New Jersey sheep farming. It yields a present profit and insures future fertility. Some counties in southern New York and eastern Pennsylvania pursue a similar course to some extent with similar results, some flocks yielding a gross increase of 200 per cent upon original cost within twelve months. A flock of sixty-eight ewes, bought in the autumn of 1868, was turned upon Virginia wheat stubble, seeded with clover, and, without other feed or care, over 100 lambs were sold in May of 1869 at five dollars per head, realizing nearly $300 above the cost of the ewes, in addition to the original stock and wool on hand. A gentleman in York

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county, Va., writes me that he keeps 100 common ewes, breeds to Southdowns, sells an average of eighty lambs annually at four dollars each, and obtains enough for wool to pay all expenses of keeping, while the benefit received by his land is equal to the interest on its value, leaving the receipts for lambs as interest and profits on investment. Another, in Clarke county, Virginia, tried Merinos and Cotswolds; both breeds did well; but while the Merino lambs brought two dollars each, the Cotswold were worth four dollars, and the prolificacy of the Cotswolds was far greater.

The profit of lamb-raising for the butcher illustrates pointedly what might be called a central truth in mutton sheep-management, to wit, the quicker the return the greater the profit; or, time gained is money saved.

Another means of rendering wool-growing profitable is effectual riddance from that unnecessary evil, that relic of vagrancy, that insignia of human worthlessness, the depredations of the dog tribe. It is a drawback upon this interest too serious to be tolerated. I have the positive assurance, from many localities, that sheep have practically been banished that dogs may be bred. The number of sheep in Massachusetts was reduced one-half between 1840 and 1850; and the reduction in ten years more was nearly at the same rate, when the sheep numbered 113,000, and the dogs, with recognized owners, fully 100,000. The nuisance was then partially abated, the dogs were taxed, and flocks increased. These losses are constant and severe. A farmer in Ohio loses sixty fine sheep in a single night; one in Tennessee gives up to a single canine sacrifice thirty-five superior Southdowns, including two rams worth $100 each; a county in Indiana submits to a tax, levied by dogs, on the full value of 1,000 sheep. The secretary of your own Society estimated the loss of New York in 1862 at 80,000 animals, worth $175,000. The State of Ohio has averaged for ten years an annual loss of 35,715 sheep, and the maiming of 23,374; and for five years the annual damage by killing and injuring was $111,548. And this includes only the ascertained loss, which must fail to express the full amount of actual injury. I have obtained an actual enumeration of 130,427 killed in a single year in 539 counties, besides nearly as many more maimed and mutilated; and there is little doubt that a full half million have been killed per annum, and a sufficient number injured to increase the loss to two per cent of the entire investment in this species of farm stock. With what a howl of indignation would the wanton seizure of one-third of the income from any six per cent investment be met, on the part of the owners of dogs!

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Long ere this, in answer to repeated demands of wool growers, would there have been a national law (as there is in England and other countries) for the protection of sheep husbandry against this savagery of vagabondism, but for the fact that the dog has a vote, by a sort of proxy, and, being a repeater, has out-voted the retiring and mild-mannered sheep. Let the full, honest poll be recorded, ovine against canine, and the verdict will stand five to one in favor of Goldenhoof; no rights will be invaded, but a grievous and bitter wrong will be righted, barbarism repressed and civilization advanced.

If it is conceded that this business may yield a profit, if conducted in accordance with the foregoing suggestions, the question comes up, "What breeds shall be kept?" This inquiry, the answer to which has been already foreshadowed, is obvious to all who will but glance at the varied conditions presented in our climatology, botany and agriculture. No single breed is suited to all these conditions; but the American Merino is admirably fitted to occupy a very wide range of these circumstances, coming nearer to universal adaptability than any other. As a Merino, no other family of this tribe can maintain an assumption of superiority. The Saxon may claim a finer fibre, and even the Silesian, and the highest type of the French, a larger frame and greater length of staple; but for compactness of form, sound constitution, strength of fibre and quantity of medium wool, suited to a variety of uses, our improved Merino is unapproachable. In the more populous sections, where meats are in demand, and prices of farms and farm products rule high, the English breeds are popular, and profitable when well managed. The Cotswold appears to have the preference of by far the larger portion of the mutton producers, on account of size, hardiness, weight of fleece, and weight of fibre. For the production of early lambs upon native or grade stock, the Southdown is the preference of three-fourths of the breeders, though the Cotswold is liked by many. The Leicester, the basis of English improvement, to which nearly all her improved breeds owe an infusion of their best blood, is too highly bred to escape deterioration under our careless practices. The Lincoln, as modified by the breeding of the last few years, is a magnificent animal, producing a lustrous combing wool of great length; and it is hoped the breed may gain a firm foothold upon certain districts characterized by succulent and abundant pasturage and large yields of roots and grains. Much of the mutton stock of the country is so mixed and degenerate that an expert would be puzzled to tell what breed is predominant, and the opinions of the sheep farmers as to the comparative merits of the different breeds are con-

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sequently confused and erroneous. It is greatly to be desired that the efforts of honest and reliable importers and breeders of really fine animals should receive encouragement; that a better acquaintance with the best types of the breeds may become general, and a more complete test of their comparative merits for different locations may be generally enjoyed.

Where to Grow Our Wool.

Finally, where can our wool be profitably grown? I answer, first, as an essential part of farm rotation and a necessary adjunct of high culture, throughout the eastern, middle and Ohio valley States, but as secondary to the production of mutton, except in poor soils or rough or mountainous regions.

But there are millions of acres, it would not be an over statement to say 100,000,000, in the mountains of the south, in the pine lands of the southern coast, the plains of the south-west, the mountain valleys and grassy slopes of the Rocky mountain system, including large portions of all the territory of the Pacific States, in which the Merino may flourish with undisputed sway. The public lands of the United States, its territory exclusive of the original thirteen and of Texas, originally comprised 1,834,998,400 acres. Of this there remained unsold and unappropriated, on the 30th of June last, 1,387,732,209 acres. In the territory of Colorado, where parks, clad in ever during verdure, are the wonder of the western world, there are 62,576,671 acres unappropriated; in Wyoming, where herds of tens of thousands of herbivorous creatures have flourished and fattened for ages, there are 59,164,789 acres; and in New Mexico, whence thousands of sheep have been annually driven to southern Mexico, purchased at twenty-five cents per head from breeders who grew rich at that rate of compensation, there are 70,704,558 acres unappropriated. This belt is undoubtedly the pasture land of America, *par excellence*, the home of the buffalo, the elk, the antelope, and the big horn sheep, whose bones lie bleaching in profusion over its vast extent. Then there are 48,749,957 acres unappropriated in Utah, 68,855,890 in Arizona, 41,239,193 in Washington, 86,836,819 in Montana, 52,125,753 in Idaho, 90,760,524 in Dacotah, and 44,154,240 in the Indian territory. Here are 625,000,000 acres of unsold public lands in the territories, without counting 369,000,000 in Alaska. The extent of grazing land in this vast area can with difficulty be estimated, but it may be illustrated by a single example of one of the four prominent parks of Colorado, San Luis, comprising an area

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twice as large as that of the State of New Hampshire. Its plains are dotted with timber, but are mostly covered with nutritious grasses, upon which stock subsists without shelter throughout the year; and upon the slopes of the mountains are dense forests of pine, spruce, cedar, oak and other growths, interspersed with broad natural meadows of luxurious grasses.

The main valley of the North Platte, 200 miles in length and ten in width, is covered with a dense growth of grass, yielding an immense quantity of hay. The tributaries of that stream, the Blue Water, Cold Water, Hill Creek, Muddy, Willard, Sweetwater, and others on the north, and the Ash, Cherry, Carter, Cottonwood, La Préle, Deer Creek, Medicine Bow, Rock Creek, the North and South and Middle Forks, and many others on the south, furnish drainage and irrigation for a territory 800 miles in length, with a width at some points of 300 miles, an area greater than that of the middle States. The growing season is practically perpetual spring, the tender herbage following up the constantly receding snow line, through the summer furnishing to flocks succulent pasturage till the snows appear again, when the grass of the valleys, undisturbed during the latter months of summer, yields rich pasturage of uncut hay in which herds and flocks by thousands luxuriate during the winter months.

Texas, which already produces the cheapest beef and the cheapest wool, is almost a solitude. With 175,000,000 acres, scarcely 3,000,000 are improved land, and the remainder lie waste, the rich grasses going to decay, a few millions of cattle and sheep proving sufficient only to utilize small and isolated patches.

There are 5,000,000 acres of pine woods land in Mississippi, upon which I have seen wild grasses standing at least twelve inches in height in February, capable of supporting millions of sheep; and a few flocks, vigorous and thrifty, were actually seen depasturing those grasses, despite the depredations of dogs, wolves and thieves, and the utter neglect with which they were treated. Fortunes would have been made there at wool growing, but for the certainty of losing caste in making a fortune upon anything else than cotton. There are similar areas in all the gulf States.

But there is one other section, broad in its extent and easy of access, superior in the quality of its grasses to any heretofore mentioned, with a climate mild and equable, in which the very finest and best samples of wool in the United States have been grown. I refer to the Allegany mountains, the chosen habitat of the blue grass and white clover, whose valleys and slopes and summits are alike fresh

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with verdure. Scarcely less known to the country at large than the fastnesses of the Rocky mountains, the lands but little higher in price, this region should produce large quantities of the finest and best Merino wool in the United States, and the production of mutton, in view of proximity to markets and abundance and quality of subsistence supplies, could certainly be undertaken with equal advantage.

Certainly here is scope and verge enough for the extension of an industry so necessary to human subsistence and comfort, and so important an adjunct of progressive agriculture. Whether wool should be sought by transmutation of the gamma or the bunch grass of Wyoming, the mesquit of Texas, or the blue grass of Alleganian slopes, only energy, enterprise, a little capital and prudent management are required to secure individual fortune and the clothing supplies of a continent.

Concluding Suggestions.

In closing, I would say to wool growers, thank God and take courage; instead of faint-heartedness there is abundant occasion for high encouragement. You can only thrive in companionship with the manufacturers; and have no occasion, and I pray you may never have, either to go abroad for woollens or for a market for your wool. Contrast the prostration of manufacturing at the close of the war with Great Britain, when the bars of the customs were let down, and the invasion of woollens proved far more a calamity than the invasion of red coats for the three previous years, with the condition of the business of manufacturing to-day. Before that war, in 1810, the value of woolen manufactures was $25,608,788; after it, in 1820, it was but $4,413,068. Before the recent war, in 1860, the value was $68,865,963; after it, in 1868, it was $175,000,000, two-thirds of it the product of wool of the United States. Is that a cause of discouragement?

By far the greater portion of this progress has been made within ten years. Many varieties of goods, never made here before, are acknowledged superior to those of foreign manufacture. Nearly all our consumption of coatings, as beaver, Esquimaux, and other cloths, are of home manufacture; our under-clothing and hosiery, to the amount of $40,000,000, is nearly all produced at home, of a quality decidedly superior to foreign makes; our ingrain and three-ply carpets are incomparably better and stronger than those of English manufacture, which are of material so poor and weak that they cannot be woven on power looms; nearly half the Brussels carpets required

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are made in this country, and now the princely Axminster, superior to the French and cheaper, has actually compelled the reduction of a dollar or two per yard. In fancy cassimeres astonishing strides have been made, great advances in certain styles of ladies' dress goods, and a successful beginning has been made with worsteds.

The following table shows how uniformly our recent importations run, and how nearly they are made up of fine cloths and dress goods:

	1870.	1869.
Cloths and cassimeres	$7,671,013	$7,010,209
Shawls	1,867,874	1,816,237
Blankets	21,952	14,782
Carpets	3,940,707	4,136,999
Dress goods	15,447,960	16,052,014
Hosiery, shirts and drawers	441,598	475,178
Manufactures not specified	5,043,955	5,054,905
Total	$34,435,059	$34,560,324

A feature of especial importance to the wool-grower, is the extension of manufacturing into his own vicinity, the great West. The number of factories there in 1860 was 259, with 294 sets and $1,616,740 capital; in 1868 the number was 557, with 995 sets, employing a capital of $5,448,000. This does not include the mills of California or Oregon, which consume several millions of pounds of wool annually, and manufacture broadcloths, cassimeres, tweeds, flannels, cloakings, shawls and knit goods. There is abundant and reliable testimony that these local mills have greatly benefited wool-growers in their vicinity, who were previously at the mercy of commercial monopolists. A feature in these fabrics, worthy of the feeling of contempt for *shams* so natural to the west, is their freedom from shoddy, flocks, mungo, and every other substitute for pure, strong, honest wool.

Wool-growers should demand the continuance of the present tariff. When free-traders tell you that protection has ruined your business, remind them of the period of the war, when the premium on gold was the highest tariff ever laid; wool was one dollar per pound, and the entire importation of woollens (notwithstanding the unprecedented necessities of the country) for four years, fell short of the value of $88,000,000, while the importations of the last five years have aggregated $204,000,000. Under that tariff the business was prosperous, and manufacturing made such strides as almost to render us independent of foreign manufactures. Remind them, also, that you obtained more per pound, in gold, in 1870 for wool than you received in 1860.

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The present tendency of manufacturing suggests the importance of enlarging the supplies of combing wool. The Canada imports in 1869 averaged 27.4 per pound declared home value, and in 1870 thirty-three cents, while the grade Merino wool from the Argentine Republic declined from twelve in 1869 to eleven cents in 1870. The price of importations from England, containing a large proportion of wool that may be combed, also advanced in the same time from 18.1 to 18.9 per pound. If England, with a climate and agricultural conditions suited to the production of but one kind of wool, has made the peculiar fabrics popular and fashionable, we should, with climates and circumstances adapted to a far greater variety of fibres, have been able so to mould public tastes and customs as to make a market for whatever wools are most naturally and profitably grown, even if we should be induced thereby to forego cloths of the finest Saxon or carpets of the coarsest Turkish.

You should adapt your business to the changing exigencies of the times and the progress of the country, making fat mutton and fine lambs the leading considerations in populous regions, where the demand is imperative for more food for the people and improved culture for the soil, and leaving the production of wool alone mainly to the pastoral regions of the far west, where 8,000,000 to 10,000,000 sheep are now profitably kept, in place of scarcely 2,000,000 in the territories and Pacific States in 1860. The region west of the Mississippi now yields nearly as much wool as the whole country produced in 1860, and is capable of producing enough for the supply of our population for many years to come, without the importation of a single pound.

Then continue to improve your flocks, increase their yield of wool, give them bettter care, protect them against diseases, persistently and intelligently follow your business without discouragement or fear, and you will find that any present cloud will show a silver lining, prophetic of a glorious future of prosperity for yourself, for agriculture and for the country.

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A BETTER MARKET SYSTEM.

REPORT READ BEFORE THE NEW YORK STATE AGRICULTURAL SOCIETY.

BY J. B. LYMAN, CHAIRMAN.

At one of the evening discussions at Utica, last fall, this subject was handled for an hour or more, and among the suggestions was a recommendation that a committee be appointed to look into the mischiefs of the New York system, and to recommend measures by which the farmer will get better prices and the consumer may purchase better food at more reasonable rates. In considering the topic in hand, we find two classes of traders in the surplus of farms, the produce and commission merchant and the middle-man. In the criticisms we may make upon the middle-man, we wish at the outset to discriminate sharply between these two. One is necessary; the other is not. One is important; the other is an impertinence. The fair and honorable produce merchant is as useful to the farmer as the depot that shelters his wagon load, the freight line that takes it to tide-water, or the bottom in which it is wafted over seas. Of course, there must be cheese merchants, and wheat dealers, and wool houses; and these traders must have their margins and win their gains, for they have disasters to survive and losses to pay. For the honorable, high minded men who conduct the great exchanges of the world, we have no feeling but that of admiration, and no words that are not words of approval. Our criticism falls mainly on a class of men that live by their wits; that impede distribution rather than aid it; who work for selfish ends, and generally by unfair means.

WHO IS THE MIDDLE-MAN?

In general he is a person who acts between farmer and consumer, and, like the monkey dividing cheese between the cats, his policy is to bite from one and then gnaw a little from the other, till he gets

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more cheese than either of the cats. There are those who say that middle-men are a great benefit to the farmer, and the more of them there are, the better price the producer will receive. Let us examine this proposition a little and see if it will hold water. There are perhaps a million of men who own land, and produce from it more than they consume at home, and who look to New York as the best market. Grant that 500 men are needed in New York to deliver that surplus to the consumers, and who must receive their pay from a moderate commission for handling. Now, double the number, and let 1,000 men push each other, and jostle and trick, and lie and swear, as they do, in order that each may have the handling of a part of that surplus. To the farmer this eagerness may seem like an active demand, and he may believe that it indicates good prices, and that the 1,000 jostling middle-men have by their enterprise and thrift made his market. Is not the truth just here; that the extra 500, who are not really needed to handle this surplus, must live, and that that living must come from the consumer and the farmer, sometimes more from one and sometimes mainly from the other; and in the end the worker in the city and the worker in the country have that 500 to support, and often to support in all their extravagance, to pay their losses, to foot their bills for drink and tobacco, sometimes to give them a greedy profit, and enable them to retire from the wharves and to give place to others as eager and as unscrupulous? Why cannot the farmer do his own marketing, and thus save what goes to middle-men? As business is arranged at present in the metropolis, this would be impracticable, and we give some reasons:

1. Two of the great railroads that bring supplies into New York, the canal, and its continuation the Hudson, run for nearly 200 miles through a country that gives but little surplus. There is some strong productive land on the Hudson; but the local population, largely non-producing, consume the bulk of it. On the Erie one reaches Binghamton, and on the Central, Schenectady, before coming into a country that yields a large surplus. Probably the county of Orange, in the matter of milk and butter, should be mentioned as an exception. Thus the farmer of central and western New York is divided by half a day's car travel, and a fare of at least four dollars, and often eight dollars each way, from the people to whom he would sell his grain, veal, cheese, apples, butter, honey, poultry, eggs, feathers, beans and potatoes. He cannot afford to spend from ten dollars to twenty dollars in going to market with a lot of produce which may be

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worth, all told, not over $200. This is difficulty No. 1, and it is insurmountable.

2. New York has legislated and established customs, all in the interest of the city and its middle-men, and adverse to the farmer.

For instance, suppose a farmer in Greene county has a fine new milch cow to sell. He reads in his newspaper that prime milch cows are bringing from seventy dollars to ninety dollars, and some as high as $100 and $120. He puts her on the boat, and goes down with her. Soon after he passes Spuyten Duyvil a person steps aboard and comes up with the air of a man of business, and praises the cow, and says: "I want that animal for my family use; she is gentle?" "O, yes." "How old is her calf?" "Four weeks." "All right; I'll go right up to the house, and send my man down to the boat for her; how much did you say?" "One hundred dollars." "All right; a good cow is worth one hundred dollars in any family."

The farmer is elated. He has sold his cow, before the boat had her lines out, at the highest price his fancy painted. He waits an hour; no man. Another hour; nothing from the nice gentleman that wanted a family cow. Soon the mate tells him the cow must leave the boat. He takes her out on the wharf, and stands there till afternoon, holding her, tired and worried, and fretted and hungry, both man and beast, till at last another "man" comes up, asks if that cow is sold. Farmer tells his story. Man asks him to describe the gentleman who was such an early purchaser. "Oh, he; he's a dead beat; you'll never see him again; I'll tell you what I'll do; I'll give you seventy-five dollars for that cow, and if you don't sell her to-night it'll cost you ten dollars to fifteen dollars to hold her another day; seventy-five dollars is about all you can make on her above expenses if you should sell for $100 to-morrow." Poor worried farmer, he yields. Both jaws of the trap take him at the ankle, and these two men work together just as even and venomous as the bows of any steel trap that ever nipped the leg of a woodchuck. This is only one instance in a thousand, and it is part of a great system for discouraging and over-reaching farmers.

REMEDIES SUGGESTED.

He who discusses a wrong should urge something by way of righting it. Your committee do not suppose that any one enactment will effectually cure the mischief. The farmer, acting alone, can do much toward a better state of things; the farmers, acting in concert, can

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accomplish much in that direction, and a little good legislation, if duly executed, will greatly aid private endeavor.

What the single farmer can do.—Let him forward his produce in packages that are perfectly honest, putting big apples in the middle of the barrel as well at the ends, keeping straw and weeds and cornstalks from the middle as well as from the hoops of his hay bales. It is always a brass shilling that a man makes by a trick in packing. If he has a good name on the wharves such deception kills it, and he will work twice as hard and wait twice as long to regain an enviable repute as it requires to win it at the outset. Let him be wise also in classifying his loads, and send, if possible, only one grade at one shipment. For instance, suppose a farmer living on the cool clays of Niagara or Wayne county sends to New York ten barrels of soft fall apples, and in the same lot five barrels of No. 1 Spitzenbergs. On reaching the wharf the merchant sees that the soft apples must be sold at once; perhaps he trades right away with a pie maker at $1.25 a barrel. This little lot of Spitzenbergs he knows will keep till March, but he is dealing in fall apples; the buyers of hard apples are not in market; he offers them to the pie maker for $1.50, and he takes them. The farmer could have got $2.50 or three dollars for those hard apples if he had kept them to mid-winter, or sent them with a large lot as soon as freezing weather is over. This is an illustration of the mistake that farmers make in apples. They use the same indiscretion in butter, cheese, dried fruit, eggs and poultry. Most of the New York merchants do a driving, not to say a slapdash business; large sales and large profits, if they can get them; large sales any how. This vice of the metropolitan system should be understood by the farmers and provided against. Classify at home. Send No. 1 butter in good company; fat chickens with fat chickens, and big, red apples only with such as are big and red and hard. Let the single farmer, unless his means are very limited, go to New York as often as once a year, and make acquaintance among the commission merchants and learn the ways of the metropolis. He may hit upon some worthy citizen who will offer to give him sixty cents the year around for ten pounds a week of sweet, yellow, firm-grained butter, who will take his honey, his lard, his jellies, his currant wine, his maple syrup, his fresh-laid eggs, and his plump chickens, at good figures.

2. *What concerted action may accomplish.*—The farmer's life is often praised because it is so independent. When that independence amounts to isolation and a refusal to coöperate with his neighbors, his

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independence is something like the liberty of Billy Bowlegs or Spotted Tail, a barbarous freedom that strips him of half his comfort and his possible gains. There are hundreds of towns in which the principal profit for four or five months is from butter. Each dairy makes after their own fashion; the rolls are kept under cloth in a cool pantry, till about fifty pounds are saved. It is then rammed into an oak or hemlock keg, set into the front end of the sleigh and taken to a depot, and shipped to a great butter house on Front or Water street. Arrived, the long steel gauge is pushed through it, and the tub or keg goes with fifty others, at a single taste, and at wholesale rates, and the poorest ball of butter in that tub gives price to the whole. Now, suppose a dozen butter makers were to act in concert, appoint one of their number to classify the balls, and pack No. 1 with nothing but No. 1. In this way ten kegs might be collected, eight of which would be of the finest quality. If these families had a friend in New York, or should send a good market man from their number, he could engage these eight tubs at the highest retail prices. Ten cents a pound on 500 pounds would give fifty dollars as the gain from this concerted action in the sale of one article. Farmers' clubs are organizations through which much of a purely business character can be accomplished. Before the discussion of the evening is taken up, appoint a committee and vote him a small sum for his expenses; his time in winter he can afford to give for a mutual benefit. Send him to New York with instructions to learn how the farmers composing the club can obtain the best prices for their eggs, poultry, butter and dried fruit. Send the best business man you have and let him act for all with the same sagacity and wisdom that he displays in the management of his own affairs. I will not believe that such qualities are not to be found. The greed of the metropolis is creeping outward I know, and shooting its virus into the redder veins of rural manhood; but there are great arteries in the body politic that as yet, thank God, are pumping only pure blood, supplying brains that are clear to see right, and hearts that are warm in the love of virtue and honor. It is not impossible to send to the Assembly men who are quite superior to a per centage, or a bonus, or a job. Such men will see that no class deserves the fostering care of law-givers so much as the order that is fundamental and indispensable to all the rest, the order without whom the engineer must box his theodolite, the merchant lock up his warehouse, the lawyer burn his red tape, and the editor chew both ends of his quill. When the farming interest is duly represented in our Assembly, when working producers outnum-

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ber talking men and ambitious men and lobbyists, and the hunters for soft places, you will have laws regulating business on city wharves; by which wheat-sowers and bakers will be brought face to face; the housekeeper will see the very hands that do her churning, that handle the curds for her table and cook the delicacies which she reserves for the end of her banquets. Such legislators will draw the wind from the craft of our middle-men; their occupation will be gone; necessity will force them to eat honest bread or to go hungry.

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FARMERS' HOMES.

A PAPER READ AT THE ANNUAL MEETING, FEBRUARY 9, 1871.

BY FRANK D. CURTIS, OF SARATOGA COUNTY.

It is often the practice with farmers to think more of the farm than of the farm-house. It is a time-honored adage that "charity begins at home;" hence we think that a few suggestions correlative to this sentiment may be profitable. There is a feeling of dissatisfaction with agricultural life among the sons of farmers, leading them to hate the occupation and surroundings of their fathers, and to seek a society and business which their fancy paints to be more congenial and less laborious. Farming is hard work at the best; and when it amounts to abject drudgery, with no sunshine in doors, and no grateful cheer of books, intelligent conversation, and encouragement to the prompings of latent ambition, not to omit good food and a pleasant home upon which the eye delights to rest, it is no wonder farmers' sons and farmers' daughters become restive, and long for the time to come when they can throw off the shackles of an unsatisfying servitude, and go to the factory, the store, or an overcrowded profession, where they can enjoy some of the privileges which they do not have at home. The remedy for this is to make home pleasant and enjoyable. Do not enrich the field and impoverish the household. Apply every exertion in culture and drainage outside the home, but do not neglect to sweeten the inner atmosphere and strengthen the ties within; so that from the intelligent happiness of the home circle there may always radiate a cheerful and intelligent, and therefore effective, energy.

Children must be made to *love* their homes, else the attractions of cities and villages will surely lure them away from the peaceful and monotonous labors of rural life. Let them plant trees, cultivate them

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and have the profits accruing from the sale of fruits they bear. Let them have fowls, animals, bees of their own; be taught how to rear and care for them, and enjoy the results of their attention and work in toys or books, or investment in the savings bank. The sense of proprietorship will give to a boy not fond of work great interest in a small potato patch, or a score of sage plants or a rod square of Lima beans. And in our country girls a love for out-of-door work should be sedulously cultivated. Let them have a garden spot, with room for flowers, herbs and vegetables, and time to take care of it. Better raise flowers and shrubs and fowls and honey, than delve in the kitchen forevermore, and then have nothing for it.

Ample provision must be made for sport during the short winter days and the long, cold evenings. Checker-boards, candy-pullings, games of various sorts, music, amusing books; these are indispensable. Let the boys have traps and catch minks and muskrats, rabbits and skunks, the more the better. Let the boys and girls have sleds and skates, with wrappings and furs of their own trapping, and enjoy the glare of frozen ice, the slippery side-hill, the glowing starlight, the jingling bells, the bracing, frosty air, and all the delights that make winter on the farm a season of festivity and sport. Then do not keep all the preserves and canned fruit, the various goodies laid up in store, only for company; but bring them out on proper occasions, just to let the boys and girls have a good time eating them, and they will be more ready in hot days next summer to renew the wasted store, and lay up future enjoyments for the coming snows and frosts.

Then remember, that any right-minded boy or girl always likes to know the reason of things. Explain to your son when you are sowing clover for manure, how and why it benefits the soil; why some soils require lime and others the acids of decomposition to render them mellow and fertile. If the children are contented and happy the young folks will be.

Let the boys earn money, and give them the benefit of your *advice*, not *commands*, how to expend it. Make the boy a man and the girl a woman, as far as you can; not a drudge or a fool, by being yourself the mouth to speak for them, the eyes to see for them, the ears to hear for them, and the brains to think and act for them. Let them act for themselves, under your care and supervision. Try to know more than they do. Spend your own surplus time in informing yourself and laying up a store of knowledge to impart to them instead of gossiping with some talkative neighbor, or telling over for the hundredth time some pig story, or affair which never had any pith or

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point and which your son hears wondering how you can be interested in such nonsense, when the wide world is before him, and nature, whose laws and phenomena are to him an enigma, is all around him, and you should be, and he expects you to be, capable to explain many of these things to him. Live, if possible, in the front side of the house, where something can be seen. Do not have all the grand and comfortable things in the parlor, which is opened quarterly when the minister comes around, and the rest of the time is sacred, unless there is a funeral or a wedding, which the girls would not postpone a great while in such a home; but have some of the cheery and nice furniture in the sitting or family room. Be sure and have such a room, if you have to do without the parlor; and have a place for books, and have some books there. In addition to what we should always expect to find (a Bible and an almanac and histories), let there be agricultural papers and books. Much can be learned from them, how to prevent disease among the animals, how to cure disease, and hints and facts about the crops which will more than repay the cost besides furnishing food for the hungry minds of the boys and girls.

The surroundings of the farmers' home can be made more comfortable. Instead of the little building situated several rods from the house which must be visited in the storms and cold and exposed to the public gaze, and which is very often a nuisance, let a lean-to be made against the rear of the dwelling or wood-house, with an entrance under cover, where tubs can be placed, and by an addition of a little earth or plaster or muck every few days nothing disagreeable will ever be experienced. The compost heap or the manure pile will receive the contents, and at least ten dollars annually of additional value will be realized for each adult. Have a cistern. Gather the materials at odd times; and if you have room in the cellar and do not want to afford time to dig a hole, wall up one corner and let the water in. Put a pump in the kitchen in the handiest place, and with a lead pipe you may draw the water to a sink within a step from the stove. Keep a stock of wood ahead. Any wife has a just reason for divorce from a husband who is so mean and so shiftless that he furnishes her stove wood from day to day; and any farmer who does it with the idea of economy is a dunce, for the time spent in hunting up the axe (and such a farmer always has to hunt up his axe or anything else he wants), and the time spent in going to and from his other work to cut the wood, and the delays waiting for meals because the wood is green and wet, would go a long way toward working up a good stock of wood, which, being seasoned and handy, the hard working housekeeper could

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use so as to save herself many a scolding; and a man who has no wood pile must be a scold, and unreasonable enough to find fault with his wife, when he alone should be blamed. Pork is the most expensive food, besides its tendency to make people gross and vulgar. A big pork eater and a man of delicate sensibilities and feelings are opposites. A pound of chicken can be produced on a farm as cheaply as a pound of pork, the same is true of mutton; both are healthier than hog flesh. Then why not raise chickens and lambs, and eat poultry and mutton?

An ice house is indispensable to a well regulated farm house. The best way to build one is to construct an addition on the north side of the kitchen or wood house and connect with it a dark room, to be used for a store room. This room, having the ice on one side, with only a partition between, and no window or ventilation except at the top, would always be cool and free from flies. Here the fresh meats and the cream and other things can be kept cool and sweet. To be handy, the ice could be taken out from the ice house through a door opening into this room and be closed on the outside all the year except when it was necessary to be open in order to put the ice in. The first cost of this addition would be but a trifle, and the expense of getting the ice nothing at all, for the farmer could do all that himself.

A nice house, with the roadside in front of it the favorite place of deposit for all the broken and dilapidated crockery, tinware and debris of the farm, is a common sight, and presents a contrast which demonstrates that the lady who presides within has no proper appreciation of the "fitness of things." Everybody likes the sweets of neatness, and the home is pleasanter if neat. Banish the swill barrel from the kitchen door and in its stead have two large pails, and a rule, which every man and boy must obey, to empty them when full into the swill barrel, which shall constitute part of the furniture of the pig house. A clear cellar, airy and free from odors, is health.

A house on a hill, with no trees around it, looks cheerless and unhomelike. Have grounds around the dwelling. Tear away the fences; they cost money and are useless. I mean the fences shutting the house up as if there was danger of its running away. Let there be not less than an acre of door yard, ten will be better. Make a rich lawn of this, and cut the grass. It can be no waste; but it will be a thing of beauty, and "a thing of beauty is a joy forever." There need not be any loss to be tasteful. Nature and beauty are synonyms. Good taste and economy can, therefore, be made handmaids to

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each other. Set out fruit trees in this inclosure and dig around them with a spade each year, and top-dress the whole, and the trees will grow finely, and the grass will grow luxuriantly, and the house will grow beautiful, the children will grow contented, the fathers and mothers as they grow old will grow happy, the neighbors will grow to emulate and to excel, the township will grow attractive, and the young men and the young women will grow up to think and to feel that there is no place after all like home, "sweet home."

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REPORT OF THE JUDGES OF IMPLEMENTS AT THE UTICA FAIR.

The committee appointed to conduct a trial of agricultural machines and implements, under the auspices of the New York State Agricultural Society, to commence at Utica on the 12th of September, 1870, met as appointed, and proceeded to the performance of their duties. As some of the competitors were not ready, the committee first took up the examination and trial of

GRAIN DRILLS.

Of seven entries under this head, there appeared on the ground four, viz.:

No. on catalogue.

900. Wilson & Murphy, East Bloomfield, N. Y., Seymour's patent; with or without grass-seeder; weight 550 pounds; sows six feet wide; price ninety dollars; with seeder, $100.

902. Bickford & Huffman, Macedon, N. Y.; "The Farmers' Favorite;" weight 554 pounds; width six feet two inches; price eighty dollars.

903. Bristol & Robbins, Owego, N. Y.; grain drill; weight 500 pounds; width seven feet; price eighty dollars.

904. Brown, Adams & Co., Shortsville, N. Y.; "The Empire Drill," with grass-seeder and land-measurer; weight 550 pounds; width seven feet; price eighty-five dollars.

The ground selected for the trial of grain drills was a piece on which oats had been grown the present year. A portion of it was plowed and harrowed on the day of trial; but being very dry, it remained lumpy and rough, not in a favorable condition for the working of the drills. The machines were all tried with wheat, as nearly as practicable with the same quantity per acre, and the different points in reference to their operation carefully observed. They were then taken to a smooth, hard road, and tried with oats and with Indian corn, the object in the latter cases being to ascertain the ability of the machines for sowing different articles, and the comparative regularity and evenness of the distribution of the grain.

After making as thorough tests as circumstances would admit of in

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regard to the operation of the machines, and giving due consideration to the advantages afforded by their peculiarities of construction, and also to the character of the workmanship and finish of each in respect to durability, as compared with the price, the committee decided, without further consultation or comparison of notes, to submit the question of superiority to a ballot, when five of the six members voted for the drill of Bickford & Huffman, and the award of the bronze medal was thereupon made to them.

The committee venture to state that it would have made the trial more satisfactory if land had been provided and prepared on which each machine could have a lot of equal extent, where the seed could have been deposited, allowed to germinate, and the plants to grow a sufficient length of time to show clearly which lot should have the preference. The conditions under which the machines were tried did not allow the committee to obtain much information in regard to the manner in which the seed was left in the drill, or the depth and other points connected with covering it

BROADCAST SOWING MACHINES, ETC.

For the offer in the Society's premium list under the head of "best sowing machine for grain, seeds and manures," the committee found quite different machines, some being broadcast sowers, and others drills, susceptible of more or less modification. Some were adapted to the draught of two horses and others to one horse. The committee, after considerable discussion, concluded to make the following divisions of the subject; 1. Combined drills; 2. Two-horse broadcast sowers; 3. One-horse broadcast sowers. Under combined drills were the entries of

No. on catalogue.

899. Wilson & Murphy, East Bloomfield. N. Y.; Seymour's patent, with grass-seeder and fertilizer attachment; weighs 900 pounds; sows six feet wide; price $125.

901. The Glen & Hall Manufacturing Company, Rochester, N. Y.; combined grain and guano drill; weighs 800 pounds; price $120.

912. Bristol & Robbins, Owego, N. Y.; machine for sowing grain; seeds and manures; weighs 600 pounds; width seven feet; price $120.

The committee were unanimous in the award of a bronze medal to Bristol & Robbins on account of excellence of construction, facility of adjustment, and the wide range of uses to which their machine is adapted. The following paragraph is from the descriptive circular of Messrs. Bristol & Robbins:

"It combines four perfect machines in one, for $120, viz.: A perfect grain drill for fall seeding, and if bought separately costs eighty

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dollars; a perfect broadcast sower and cultivator, for spring seeding and buckwheat, and if bought separately costs seventy-five dollars; a perfect plaster, lime and guano sower, depositing the fertilizer with the grain in the drills or broadcast, and if bought separately costs fifty dollars; a perfect grass-seeder, depositing the seed in front of the teeth, thus rendering the seed much more certain of a speedy growth than if sown behind the teeth, costs ten dollars. Cost of the machines if bought separately, $215; cost of combined machine, $120; saved to farmers by buying the combined machine, ninety-five dollars."

The committee think it proper to state that they regard the machine of Wilson & Murphy as superior for sowing plaster and other fertilizers.

Under the head of two-horse broadcast sowers were the following:

No. on catalogue.

908. Wilson & Murphy, East Bloomfield, N. Y.; Seymour's plaster sower, with grass-seed attachment; weighs 325 pounds; price sixty dollars; grass-seeder, extra, ten dollars.

910. Osborne, Foster & Company, Palmyra, N. Y.; two-horse broadcast sower, with harrow or cultivator attached, for sowing all kinds of grain and covering at the same time; also to sow plaster, lime, ashes, etc.; weighs 450 pounds; sows seven feet wide; price seventy-five dollars.

A bronze medal is awarded to Osborne, Foster & Company, on account of the harrow attachment and the good work performed by their machine.

Of one-horse broadcast sowers, there were:

No. on catalogue.

907. Wilson & Murphy, East Bloomfield, N. Y.; Seymour's patent grain, grass-seed and fertilizer sower; weighs 300 pounds; sows eight feet three inches wide; price seventy-five dollars.

909. Osborne, Foster & Company, Palmyra, N. Y.; steel tooth hay and grain rake, with attachment of broadcast sower, for grain, seeds, plaster, etc.; weighs 300 pounds; price sixty-five dollars.

916. James House, Houseville, N. Y.; broadcast sowing machine, for grain and plaster; weighs 250 pounds; sows nine feet wide; price fifty dollars.

A bronze medal is awarded to Wilson & Murphy, on account of the ready adaptation of their machine to the purposes for which it is designed, and the amount of work that can be done with it for the force required.

Mr. House's sower, although simple and convenient in plan, is regarded by the committee as too slightly made to be used economically.

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HAND SEED-DRILLS.

Two entries only, viz.:

No. on catalogue.

1184. F. F. Holbrook & Company, Boston, Mass.; Holbrook's patent regulator seed-drill; weight thirty-eight pounds; price twelve dollars.

1185. Samuel L. Allen, Cinnaminson, N. J.; The Planet hand seed-drill; this drill has but one handle, making it light and easy to manage, and preventing walking on the row; a hinged plow is always in position when in use, and out of the way when not; it never clogs; the carrying wheels also cover; size No. 1, two pounds seed, six dollars; No. 2, ten pounds seed, eight dollars; No. 3, for seed and fertilizers, spreading or not in the row and dropping in hills; capacity half a bushel; price, not yet fixed, about fifteen dollars.

Both machines were tried by the committee, who unanimously gave the preference to Holbrook's, the construction and operation of which were highly satisfatory, well entitling it to the award of a bronze medal.

HARROWS.

Of the four entries under this head, three were represented before the committee, viz.:

No. on catalogue.

895. Gibson & Inglis, New York Mills, N. Y., flexible harrow; weighs 240 pounds; six feet six inches by seven feet nine inches; price thirty dollars; used for all purposes of ordinary harrows; also as a brush harrow, and for scarifying meadows and pastures; for collecting in heaps quack-grass, weeds, etc, on stubbles, and for pulling turnips.

896. William Addleton, Elbridge, N. Y.; Addleton's patent spike-link harrow: iron; weighs 200 pounds; four feet six inches by six feet six inches; price thirty-five dollars.

897. F. Nishwitz, Williamsburgh, N. Y.; Nishwitz's pulverizing harrow, two sizes; five feet square, weighing 200 pounds, thirty dollars; and six feet by six and one-half feet, weighing 230 pounds, thirty-four dollars.

The implement of Gibson & Inglis is a modification of the English chain-harrow. It is made of malleable iron in links about four inches square. At each corner of the links are pointed knobs, projecting about three-quarters of an inch, which answer the purpose of teeth in scarifying old grass-land, and also aid in breaking down lumps, collecting weeds, etc. The use of the implement is not much known in this country; but the committee think it might be adopted by our farmers with great advantage. Some members of the committee have witnessed its operation in England and Scotland, where its use is regarded as almost indispensable in cleaning land from vegetable

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rubbish. A bronze medal is awarded to Gibson & Inglis for this implement.

Mr. Addleton's harrow was tried by the committee, but they did not discover that it possessed particular advantages over the ordinary form of harrows.

Nishwitz's harrow is widely different in construction and action from the common harrow. Its working parts consist of a series of sharp-edged, circular, concave disks, revolving on steel journals. It was exhibited at the trial of implements held at Utica in 1867, and was described in the report of that trial, page 627, Transactions New-York State Agricultural Society, 1867, part I. The committee believe that three years' additional experience with this implement gives ample proof of its value. At the former trial some doubt was expressed as to the durability of the parts most exposed to wear. Mr. J. B. Norton, of Utica, who exhibited it at the late trial, brought to the notice of the committee a disk and journal which he stated had been used extensively for five years. They were but little worn.

The special advantages of this implement are for pulverizing sward-ground lately ploughed. This it effects in the most thorough manner, without turning up the grass. Neither does it pack or condense the under portion of the soil, as is done by the common harrow; it leaves all the soil that was inverted by the plough, in a mellow state, well adapted to the germination of seeds and the growth of young plants. The committee award for it a bronze medal.

In connection with harrows, it is proper to mention Shaver's patent riding attachment, entry 1068. It is connected with the harrow by a curved pole and swivel link, so as to hold the fore end of the harrow down, causing it to run more evenly. This contrivance, attached to a square seed-harrow, was exhibited to the committee, both on stubble and sward recently ploughed. It worked exceedingly well, and appeared to run very light for the team. The merits of the invention seem obvious, as by its use harrowing may be done by persons who could not bear the fatigue of walking over loose ground. The committee believe the invention is one by which the public may be benefited, and therefore award a bronze medal. The proprietor is A. D. Shaver, Belleville, N. Y.

CULTIVATORS OR HORSE-HOES.

The Society's premium list comprises the offer of a premium for the "best horse-hoe for root crops," and the "best horse-hoe for grain-fields." The committee believed that the latter had special reference

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to two-horse implements, and that in the former case those adapted to one horse are more generally used. Some of the implements entered were, however, designed for several purposes, for the cultivation of Indian corn, potatoes, etc., as well as for roots. Of those particularly calculated for grain-fields, were:

No. on catalogue.

938. P. S. Carhart, Collamer, N. Y.; Two-horse cultivator; weighs 160 pounds; width five feet; price eighteen dollars

939. John Cantine & Company, Schenectady, N. Y.; L. R. Wright's patent two-horse cultivator, weighing 115 pounds; price fourteen dollars.

The committee regarded Mr. Carhart's implement as best adapted to working grain-fields, and award him a bronze medal.

The attenion of the committee was called to an implement (entry No. 941) presented by Charles W. Moseley, Onondaga, N. Y., intended for destroying quack-grass, thistles and weeds generally. It consists of a triangular blade of steel set in a frame, to run horizontally one or two inches below the surface of the ground, and cutting a breadth of about two feet. Mr. Moseley bases his operations with this implement on the principle: "That if vegetation is not permitted to grow or live above the surface of the earth, it cannot exist any great length of time below it." He therefore passes this implement over the ground as often as vegetation appears fairly above the surface. In regard to quack-grass, he first plows the ground eight inches or more in depth, in order that, as the roots of the grass occupy from four to six inches of the top soil, there may be two inches of soil free from roots for the implement to work in. He states that by cutting off the grass as soon as it appears, the whole mass of roots is killed in a single season, allowing the ground to be plowed to the depth above mentioned, turning up only a lifeless vegetable mould. It is stated that similar results ensue from cultivating or going over ground where Canada thistles and other weeds grow.

In justice to the claims of Mr. Moseley, the committee submit these statements. At the same time it is not improper to state that the committee were of the opinion that an implement covering so much surface as this, would need to have the ground quite smooth and free from stones; that upon uneven land a narrower cutting implement, or one consisting of several cutters, would be likely to work the surface more thoroughly. The implement in question was only tried on the stubble ground, where the drills, harrows and cultivators had been used, which afforded but little evidence in regard to its ability to do the work for which it was intended. In regard to the destruction of

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quack-grass, it may be added that the idea has been generally held that the ground could be more effectually cleaned by pulling out the roots, and in England tools constructed for this purpose are used. Still, the question as to the best mode of effecting the objects alluded to, must be settled by actual trial.

Of one-horse cultivators, there were the following:

No. on catalogue.

921. John Cantine & Company, Schenectady, N. Y.; L. R. Wright's patent one-horse cultivator; weighing seventy pounds; price ten dollars.

934. F. L. Perry, Canandaigua, N. Y.; scarifier or cultivator for corn, potatoes, root crops, etc.; weighing ninety pounds; price twenty dollars.

935. Ford Brothers, Oneonta, N. Y.; Howe's patent "Excelsior" sulky cultivator, No 1, for two horses and two rows; weighs 400 pounds; price sixty dollars.

936. Ford Brothers, Oneonta, N. Y.; Howe's patent "Excelsior" thill cultivator, No. 2, for one horse and one row; weighs seventy-five pounds; price twelve dollars.

The cultivators were tried on the ground before mentioned as prepared for the drills. The stubble, weeds and dry lumps of earth rendered the implements liable to clog. The two-horse cultivator of Ford Brothers, was that which received one of the premiums at the trial of 1867. It has, however, been somewhat improved since then in reference to compactness and adjustability. It worked well on this occasion, excepting that it clogged considerably in passing over spots where the weeds and stubble were drawn up. It was, however, subsequently stated, in explanation of this, that the person who managed the implement omitted a simple adjustment in the position of the feet or teeth, which, it was claimed, would have obviated the difficulty.

Mr. Perry's implement was fitted with pretty long, curved teeth, with steel, chisel-shaped ends for penetrating the ground, which it would do, even where it had not been plowed and was overgrown with weeds. The committee regarded this as a very valuable point in the general merits of the implement. It is frequently the case that ground becomes considerably packed by rains after the crop has been planted, and an implement that will thoroughly loosen the soil to the depth at which it was plowed, without bringing up the sward, has long been needed. Mr. Perry's implement is also fitted with wider teeth to work over the soil stirred by the narrow ones. The committee award to Mr. Perry a bronze medal on account of the adaptation of his implement to the culture of roots, Indian corn and other crops.

Two hand cultivators were presented for the examination of the committee, viz: that of John Cantine & Company, Schenectady, N. Y., price seven dollars; and that of F. F. Holbrook & Company,

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Boston, Mass., price six dollars. For the former the committee award a certificate of merit. They were, however, of the opinion that the implement of Messrs. Cantine & Company would be improved by havng a larger wheel attached, which would cause it to run more easily over soft ground.

POTATO-DIGGERS.

Of the eleven machines entered under this head, there appeared at the trial the following:

No. on catalogue.

947. I. W. Innis, Newburgh, N. Y.; machine adapted to one horse; estimated weight 120 pounds; price twenty dollars.

949. J. P. Davison & Son, Rome, N. Y.; Davison's iron clad potato-digger; patented August, 1868; drawn by two horses; runs on four wheels; driver rides on machine; has an endless chain belt, with finger bars and shakers; weighs 450 pounds; three feet wide; price $100.

950. H. Carrier & Company, Albany, N. Y.; the Carrier potato-digger; drawn by two horses; has a scoop, taking up the whole hill to the necessary depth, passing it thence to an elevator, thence to a vibrating separator; runs on two wheels; driver rides on machine; weighs 750 pounds; price not yet fixed.

951. Brinkerhoff & Van Dusen, Auburn, N. Y.; Brinkerhoff's hand potato-digger; weighs eight pounds; price seven dollars.

953. George W. Kintz, Rochester, N. Y.; the "Free and Easy;" a plow form potato-digger; weighs 170 pounds; price thirty-five dollars.

954. John Eynon, Utica, N. Y.; potato-digger; weighs 150 pounds; price sixty dollars.

956. Cook Darling, Utica, N. Y.; potato-digger on four wheels, with two knives and four revolving forks, turned by gearing; weighs 450 pounds; price $125.

The machines were first taken to a field much overrun with thistles and weeds, the potatoes unripe and the vines or tops very strong. Most of the competitors were much opposed to trying their machines under such circumstances. They were told by the committee that one row would be assigned to each machine; that each competitor might make any preparation of the ground that he pleased, but whatever was done would be noted and taken into consideration in judging of the merits of the machines. All the managers of the machines drawn by horses made more or less preparation by pulling the weeds along the row, cutting off the potato tops, etc., except the manager of the Kintz machine. Eynon (No. 954) cleaned the hills entirely from weeds and cut the potato tops. The task proved too great for most of the machines. Kintz's (No. 953), from its simplicity, being like a plow, without a mould-board, but having rods extending backwards attached to the share or digging part, performed best. The others may be said to have proved failures, so far as relates to their performance in the

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first trial. The machine of Carrier & Company (No. 950) was broken through its main frame and totally disabled soon after starting.

After trying the machines among the weeds and thistles, the committee adjourned to another field, where the weeds had all been pulled from the ground, the ground pretty dry, and the potatoes ripe. All did better work here than in the former trial, but Kintz's, on the whole, did best here. Its draft appeared light, and it left the potatoes fairly exposed, but it was hard to hold. Most of the others were entirely too complicated, requiring much force to draw them, and were liable to clog. Davison's (949) clogged with small stones four times, but it left the potatoes in good order. Eynon's (954) worked well in the lightest and freest soil, but clogged badly with stones and the dry tops of the potatoes. Innis's (947) one-horse machine scattered the potatoes too much, and cut some. Carrier & Company's machine (950) having been repaired since it was disabled, appeared in the second trial and worked better than before, but scattered the potatoes too much, and buried some. Darling's (956) dug well, but the potatoes were considerably cut by the revolving forks. This was the principal objection to the machine, and some of the committee thought it might be easily obviated.

The committee were of the opinion that none of the diggers drawn by horses possessed sufficient merit to justify the award of a medal, but that from the tests made, Kintz's is entitled to the preference, and the award of a certificate of merit is made for it.

It may be proper to add that an entry of a potato digger (955) was made by John Hall, Jr., Pittsburgh, Penn. Its weight was stated to be 100 pounds, and the price sixteen dollars. It did not reach the ground in time for the regular trial, but it was taken to the field where the second trial was made, and its operation was witnessed by some of the committee, who thought it worked as well as any of the others. It is simple in construction, plow-shaped, cheap, and apparently durable.

The hand potato-digger of Brinkerhoff & Van Dusen was tried in the field where the horse machines were first tried. It was worked by Mr. Brinkerhoff, who dug the lot assigned to him, without any preparation of the ground, at the rate of eighty-three hundredths of an acre in ten hours. The lot was chiefly a headland, heavily packed from the treading of teams. The committee were entirely satisfied with the manner in which the work was done, and award to Brinkerhoff & Van Dusen a certificate of merit. The implement is a steel fork, with two handles, a rest or brace being attached by a hinge to

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the upper end of the fork on the under side. It readily takes a hill of potatoes at once and leaves them in good order for picking up.

HAY CARRIERS.

No. on catalogue.

1048. Homer W. Fitch & Company, Lithgow, N. Y.; Hinman's hay conveyor, for unloading hay in barns, etc.; to be used with a horse-fork; weighs sixty-five pounds; two feet by one; price twenty dollars.

1051. George Smith, Syracuse, N. Y.; hay slings and carrier for unloading hay slings ten dollars; carrier fifteen dollars.

1052. E. U. & W. L. Scoville, Manlius, N. Y.; Scoville's patent hoisting apparatus or hay carrier, for conveying hay from the load to any part of the barn by means of a rope track; constructed of cast iron; weight sixty pounds; price fifteen dollars.

1056. John H. Chapman, Clayville, N. Y.; Chapman's railway pitching apparatus, for unloading hay, grain, straw, etc., into barns and sheds; consists of grapple-fork, conveying car, post-pulley and attaching grapples; weighs 125 pounds; price twenty dollars; the car and fixtures, fifty pounds; price sixteen dollars; the post-pulley, four dollars; attaching grapples, three dollars.

1062. A. J. Nellis, Pittsburgh, Penn.; Nellis's stacker, for stacking or for loading hay from the stack upon the wagon.

Some of the carriers were worked on a frame of wood; others on ropes. The committee thought it proper to separate the two kinds. Considering simplicity, strength and cheapness, they award to George Smith (1551) a bronze medal for his carrier running on wood.

For rope carriers the committee award a bronze medal to E. U. & W. L. Scoville (1052).

HAY FORKS AND SLINGS.

Of these the following entries were represented before the committee:

No. on catalogue.

1051. George Smith, Syracuse, N. Y.; slings.

1053. E. U. Scoville, Manlius, N. Y.; Scoville's patent horse hay-fork; weighs twenty-five pounds; price twelve dollars.

1054. G. Van Sickle, Shortsville, N. Y.; rope hay and grain unloader; weighs fifty-five pounds; price twenty dollars.

1055. The Pennock Manufacturing Company, Kennett square, Philadelphia, Pa.; Harris's double harpoon horse hay-fork; weighs twenty pounds; price ten dollars.

1056. John H. Chapman, Clayville, N. Y.; the Raymond grappling-fork; price, with pulleys and hooks, twenty dollars.

1060. A. J. Nellis, Pittsburg, Pa.; Rogers' original harpoon horse hay-fork, improved; price, thirteen dollars.

As slings and forks are designed to accomplish similar purposes, the committee thought it proper to try them in connection. The

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slings are ropes, laid lengthwise of the load while it is being formed, allowing such layers of hay or grain to each as is desired. They are hooked to a ladder at the fore end of the wagon, and have rings at the other end, through which the rope is passed when it is to be attached to the pulley, doubling up in a bundle the stratum and taking it from the hook as it is elevated. It is all dropped together. The committee think that, in many situations, it would not be easy to spread hay dropped in such large masses, so as to give it that equal distribution over the mow that is desirable in order to have it settle well. With forks it could be readily dropped in almost any place, and in quantities that would admit of easy and even distribution. It appears, therefore, that whatever advantage slings may have over forks in reference to rapidity of unloading, is more than balanced by the points in favor of the latter, as above mentioned; and the committee confined their awards to forks, on the principle that they were best adapted to general farm use.

In regard to the offer of a premium for the "best fork," the committee thought they could not be justified in confining themselves to one particular use of the implement. It is well known that some forks which work well in long hay, are not so well adapted as others to pitching barley or loose straw. It was, therefore, concluded to divide the subject by first considering which was best for general purposes, and, second, which was the best for hay.

They award, in the first case, a bronze medal to John H. Chapman, for Raymond's grappling fork; and, in the second case, they make the same award to The Pennock Manufacturing Company, for Harris' double harpoon fork, as the best for hay. This is what is called a one-finger fork, though two forks are attached together.

Mr. Chapman used his post pulley in working his fork. The committee regard it as a valuable auxiliary in the use of horse forks. It cannot, perhaps, be better described than in the following language, from Mr. C.'s circular:

"The post pulley is a simple device for diminishing the travel of the horse. It consists of a pulley with casting-off plate, attached to the top of a post. The post is located half the distance from the starting point which the horse must travel in conveying the forkfull to the place of discharge. The horse goes to and around it, and returns, the pulley retaining the rope while the horse is coming back to the starting point. The operator on the load having discharged his fork, begins to draw it back; this moves the pulley in the opposite direction, carrying the casting-off plate under the rope and releas-

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ing it at once. Thus it will be seen the horse travels but once over the ground, not having to back up or return empty. The post pulley is entirely *self-operating;* the driver does not guide the rope to the pulley."

The committee regard the clamps used by Mr. Chapman as, on the whole, preferable to any exhibited to them, on account of their simplicity and the convenience with which they may be attached or removed.

POWER CUTTING MACHINES.

Of fodder cutting machines adapted to power, the following were tried:

No. on catalogue.

1090. George Parnell & Son East Ontario, N. Y.; No. 2 feed-cutter for horse-power; weighs 825 pounds; price sixty-five dollars.

1092. Fulton Manufacturing Company, Fulton, N. Y.; by A. S. Hamilton & Company, Rochester, N. Y.; Cummings' improved feed-cutters, power machines; No. 3, weighing 530 pounds; price sixty-five dollars; No. 4, weighing 800 pounds; price $100.

1094. Reuben Daniels, Woodstock, Vt.; Daniels' self-feeding stalk and hay-cutter; power machine; weighs 500 pounds; price sixty-five dollars.

The machines were run by steam power, and were tried for both hay and corn-fodder. No note was taken of the amount of hay or fodder cut in a specified time. All cut rapidly enough. The committee directed their observations to the construction of the machines in reference to durability, to the manner in which the work was done, ease of attendance, etc.

The machine of Parnell & Son is similar to English cutting or chaffing machines that have been long in use, but with some improvements. It has two knives of semi-circular form, the edges on the outer line, fastened to the opposite arms of an iron wheel. The length of cut is governed by spiral gear attached to the main shaft, by which the feeding gear is moved. The journals of one of the rollers between which the fodder passes to the knives, admit of its rising or falling according to the amount of fodder passing, but it is kept constantly pressing on the fodder by a lever on which is a moveable weight by which the degree of pressure is regulated. The feeding is quite easy, and the machine works with steadiness and regularity. It is simple and strong. The committee award for it the Bronze Medal.

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Cutting Machines for Hand Use

No. on catalogue.

1091. Fulton Manufacturing Company, Fulton, N. Y.; by A. S. Hamilton & Company; Rochester, N. Y.; Cummings' improved feed-cutters; hand machines; No. 1, weighs 200 pounds; price twenty-six dollars; No. 2, weighs 300 pounds; price thirty-two dollars.

1093. Reuben Daniels, Woodstock, Vt.; Daniels' self-feeding stalk and hay-cutter; hand machine; weighs 175 pounds; price twenty-five dollars.

The committee give the preference to the Daniels machine as being more essentially a self-feeder, cutting the fodder of more uniform length, and generally leaving the coarser cornstalks split in two or more pieces. They award for it the Bronze Medal.

Stump Machines.

The only machine presented to the committee for trial, was that of C. A. Church, New Berlin, N. Y., (entry No, 875.) It is called "The Pioneer Stump-puller;" weighs 300 pounds; price eighty-five dollars. It is a very simple lever machine, by which it is claimed two men can raise 25,000 pounds, or three men, with one of a larger size, 35,000 pounds, or four men, with one still larger, 50,000 pounds. The levers work pawls which, being made to bite and hold on a smooth bar at any point, save the slightest gain that is made in raising the stump. Although this machine was without competition, the committee think its marked merit warrants the award of the Bronze Medal.

Ditching Machines.

John Valentine, Buffalo, N. Y., by D. Whiteside, general agent, exhibited Carter's ditching machine, described in the entry as follows:

No. on catalogue.

1071. The principal parts are an iron wheel, and a car upon which the driver stands and can regulate the depth. The wheel is four feet in diameter, eight inches wide, with a five-inch flange on each edge; between the flanges are cogs, five inches long, in pairs twelve inches apart; behind and close to the wheel, is a plow-shaped cutter, from which the wheel carries the earth to the top and discharges it by a spout at the side: cuts three feet deep and eight inches wide; is worked by two men and three or four horses; weighs 1,370 pounds; price $175.00.

This machine appears to be a Canadian invention, and has been used with advantage by various persons in the province of Ontario. In the trial before the committee, the machine was drawn by two pair of horses, neither of which had been accustomed to any such work, and they were at first too awkward in their movements for the

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operator of the machine to proceed rapidly with the digging. The ground was a part of the field on which the New York State Agricultural Society held its exhibition in 1870. After the machine had been placed, but before it was tried, a heavy rain occurred, which made the ground too soft for the horses, and too muddy for the best working of the machine. The subsoil contained some stones of various sizes, and occasionally one would stop the machine till it could be taken out; but the delay from this cause was not serious. One man guided the machine, and it did not appear to be very hard for him to do so. The committee were, on the whole, well pleased with the machine. It seems capable of accomplishing more, compared with its cost and the expense attending its operation, than any machine they have seen designed for a similar purpose. It is simple, strong, and, so far as we could see, not likely to get out of order. Although it had no competitor, the committee think it fully deserves the award of the bronze medal.

Jason C. Osgood, Troy, N. Y., presented for the examination of the committee, a model of a ditching machine. It is designed for cutting large, open ditches. The machine weighs 5,500 pounds; its length eighteen feet; width seven feet; price $1,000. It may be operated by steam or horse-power. In the latter case a railway or endless-chain power is attached to the machine. The machines which Mr. Osgood has made, were for sugar plantations in Louisiana. He has testimony that they are well approved there. But it does not seem to the committee that in New York, or the middle or northern States, a machine to cut *open ditches* is particularly desirable. Its use would be confined chiefly to swamps and bogs. Mr. O. stated that he could make a machine for digging trenches for drain-tiles. It is probable he can, and when such a machine is brought forward and *tried*, its merits can be decided on. The committee understood that the Society, by resolution, had decided that awards should not be made merely on *models*. This would, of course, preclude any award in Mr. Osgood's case, even if the committee had felt called on to give such an indorsement of his machine. It is undoubtedly valuable for the section and purpose to which it is adapted, but has not the leading requisites of a ditching machine for northern farmers.

CORN SHELLERS.

No. on catalogue.

1097. Harmon W. Cornell, Owego, N. Y.; Double corn sheller, separator and cleaner, for hand power; weighs 150 pounds; twenty-four by fifteen inches; price thirty dollars.

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No. on catalogue.

1098. A. B. Thompson, Owego, N. Y.; Corn sheller, invented by exhibitor; weighs eighty-pounds; price fifteen dollars.

With the consent of the other exhibitors, H. L. Emery, superintendent of the Albany Agricultural Works, presented a hand corn sheller, the price of which was sixteen dollars, ten per cent off for cash. This, not being regularly entered, is not on the catalogue. Mr. Emery also exhibited Smith's (?) power corn sheller.

All the machines were tried: first with new corn which proved too soft to shell well; afterward with very dry old corn. Emery's shelled a bushel of ears in two minutes fifty seconds. Shelled clean, and separated cobs from corn. In the first attempt with dry corn, it clogged and stopped. Cornell's machine (1097) shelled a bushel of ears in three minutes thirty seconds, separating cobs from corn, and cleanly winnowing the corn. When forced some ears were not shelled clean. Thompson's machine (1098) shelled a bushel of ears in two minutes fifty-six seconds. Corn and cobs mixed together; not quite clean shelled.

The committee award the bronze medal for Cornell's machine (1097), on account of the performance of all that is required in shelling and cleaning corn.

Mr. Emery's power machine was started and run for a few minutes, when it was stopped by the clogging of the cobs in the cylinder.

Root Cutters.

No. on catalogue.

1110. John R. Robertson, Syracuse, N. Y.; Robertson's root cutter; weighs 100 pounds; two feet square; price fourteen dollars.

1111. John F. Smith & D. H. Underwood, Westmoreland, N. Y.; Root cutter, constructed with a large knife, having nine or more small knives attached, and worked by a lever; weighs sixty pounds; price fifteen dollars.

H. L. Emery, for the Albany Agricultural Works, was allowed to compete with the other exhibitors, his machine not having been regularly entered.

Roots are cut for sheep and cattle, but the manner of cutting should be varied considerably to give the form of piece best fitted to the masticating power of the two species of animals. The mouths of cattle are wide, and the jaws will readily take in pieces three or four inches in width, and an inch or two inches in thickness. They will eat pieces of such size better than those that are very thin. Sheep require a much smaller and different shaped piece, one about three-fourths of an inch wide and half an inch thick has been found to answer well. The length is not of so much consequence; the sheep

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take the pieces by one end, and draw them into the mouth as fast as the teeth grind them down.

Neither of the machines brought before the committee, cut the roots in the most desirable form. They gave the preference on the whole, to Robertson's (1110), and award the bronze medal for the same. The cutting is effected by means of knives set in a gouge form into a cast iron cylinder. The machine was not very well made, but it cut carrots and pumpkins quite rapidly, and the size and shape of the pieces were tolerably well suited to sheep.

The cutter of Smith & Underwood (1111), requires too much labor to work it, and having nothing by which the thickness of the slices is regulated, there is too much variation in the size of the pieces as they are left after passing the small knives.

CIDER MILLS.

No. on catalogue.

1106. Warder, Mitchell & Company, Springfield, Ohio; improved Buckeye cider mill; two sizes; twenty-five dollars and forty-five dollars.

1107. Reuben Daniels, Woodstock, Vt.; Daniel's patent power cider mill; weighs 250 pounds; price sixty dollars.

H. L. Emery, for the Albany Agricultural Works, was allowed to compete with hand and power machines, not regularly entered.

The second sized mill of Warder, Mitchell & Company ($45), worked by one man, ground a level bushel of apples in 1 minute 33 seconds; pressed in 2 minutes 20 seconds; making time of grinding and pressing 3 minutes 53 seconds; cider obtained, 16¼ pounds; pomace, 22 pounds.

With Emery's mill, an even bushel of apples was ground in 5 minutes; pressed in 7 minutes 40 seconds; making time of grinding and pressing 12 minutes 40 seconds; cider obtained, 19 pounds; pomace, 15 pounds.

Daniel's mill ground two even bushels of apples in 2 minutes 40 seconds; time of pressing —— ——; cider obtained, 39½ pounds; pomace, 33½ pounds.

The committee think the mill of Warder, Mitchell & Co. entitled to the preference, on account of its compactness, the ease and facility with which it may be worked, and the results that can be accomplished by it in proportion to the time and labor employed. They award for it the bronze medal.

FANNING MILLS.

No. on catalogue.

1083. J. K. Krake, Alden, N. Y.; fanning mill, capable of separating chess, cockle and oats from wheat, &c.; weighs 200 pounds; price thirty dollars.

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The above was the only fanning mill presented for the examination of the committee. It appeared to do its work very well, and a certificate of merit is awarded for it.

FARM GRAIN MILLS.

No. on catalogue.

1105. Munson Brothers, Utica, N. Y.; a twenty-four-inch portable grist mill, E. Munson's patent; double-geared; iron and wood; weighs 1,968 pounds; price $250.

This is called a 10-horse power mill. It was run by steam, and ground Indian corn quite fine, at the rate of a bushel in 7 minutes 10 seconds. The committee regard it as entitled to the award of the bronze medal.

GRAIN SCOURERS, SMUT MILLS, &c.

No. on catalogue.

1084. Hinsdell, Drake & Way, Camillus, N. Y.; grain scourer and separator; weighs 400 pounds; five feet by three feet; price not yet fixed; was finally given to the committee at $200.

1085. S. W. Paine, Troy, Penn.; H. B. Ingham or California wheat cleaner, smutter and separator combined, for the use of flouring mills; No. 1 weighs 1,000 pounds; price $200; No. 2 weighs 800 pounds; price $150.

These machines were tried on wheat containing an uncommon quantity of smut. It was cleaned remarkably well by both, there being no perceptible superiority in this respect in favor of either machine. But the committee consider the compactness, excellence of workmanship and comparative cheapness ($150) of Mr. Paine's machine entitles it to the preference, and they award for it the bronze medal.

The committee regard the machine of Hinsdale, Drake & Way as a highly valuable one in reference to accomplishing the purpose for which it is designed and award for it a certificate of high merit.

CATTLE PUMP.

No. on catalogue.

1112. Edward Backus, Rochester, N. Y.; Patric's improved cattle pump; 200 pounds; price fifty dollars.

This is a very ingenious invention for allowing cattle to draw water for themselves to drink. By stepping on a platform, the water is forced up from the well into a trough from which the animals drink.

Persons who have used it testify to its successful operation. The committee award for it a certificate of merit. No competition.

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DOUBLE-ACTING FORCE PUMP.

No on catalogue.

1113. The Bridgeport Manufacturing Company, Bridgeport, Conn.; by C. A. Bacon and H. D. Freyer, agents, Oneida, N. Y. The American submerged pump for farm use, and for all other purposes of raising water by hand or power, and for throwing water through hose; so constructed as to be unaffected by frost; five sizes; capacities, 20, 35, 70, 140, and 400 gallons per minute; prices, iron, $12, $20, $30, $50, $200; galvanized, $15, $25, $36, $65, $250.

The advantages claimed for this pump in reference to security against frost, and throwing water through hose, appear to the committee to be well founded, and they award for it a certificate of merit. No competition.

COTTON-GIN AND CONDENSER.

No. on catalogue.

1069. The Albany Agricultural Works, Albany, N. Y.; the universal cotton-gin; thirty-five saws; weighs 500 pounds; price $173.25.

1070. The Albany Agricultural Works, Albany, N. Y.; the universal condenser for cotton-gin; weighs 275 pounds; price $102.38.

As there was no competition in this class, the committee are unable to say how the above named machines would compare with others designed for the same purpose. So far as could be judged from the trial of them, their operation is highly satisfactory and justifies the award of a bronze medal for the gin and condenser.

HORSE-CLIPPING AND SHEEP-SHEARING MACHINE.

No. on catalogue.

1210 The American Horse-Clipping Machine Company, Nashua, N. H. The American horse-clipping and sheep-shearing machine; weighs 100 pounds; price $100.

As the name purports, this machine is designed for shearing sheep and clipping horses; either for clipping over the whole body, or cutting the long hair from the legs, jaws, &c. On the present occasion it was tried for the latter purpose, and performed the work in an expeditious and satisfactory manner. The committee regard it as a useful machine, and award for it a certificate of merit.

WASHING MACHINES.

No. on catalogue.

1115. Brinkerhoff & Van Dusen, Auburn, N. Y.; Continental washing machine; weighs sixty-five pounds; two feet by two feet; price fourteen dollars.

1118. G. H. Kidney, Cleveland, Ohio, by J. N. Richards, Utica, N. Y.; Kidney's washing machine; consists of a boiler with cylinder inside; weighs thirty pounds; twenty-four by fourteen inches; price fifteen dollars.

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No. on catalogue.

1119. Samuel De Veau, Syracuse, N. Y.; washing machine, consisting of a common wash-boiler with wheel inside and a tight cover; price fifteen dollars.

1121. John Slater, Norwich, N. Y.; washer and boiler; weighs twenty-seven pounds; price fifteen dollars.

These were all the washing machines that were presented for actual trial. After a thorough test, in which members of the committee were assisted by several ladies well known for their judgment in all matters belonging to the laundry, the award of the bronze medal is made to Brinkerhoff & Van Dusen, whose machine is deemed to possess decided advantages in reference to simplicity and effecting the desired object without injury to the clothes. A certificate of merit is awarded to Samuel De Veau.

LAWN MOWERS.

No. on catalogue.

1186. Chadborn & Coldwell Manufacturing Company, Newburgh, N.Y.; hand lawn mower for lawns and borders; weighs sixty-eight pounds; width eighteen inches; price twenty-five dollars.

1187. Graham, Emlen & Passmore, Philadelphia, Pa., by J. M. Childs & Company, Utica, N. Y.; the Philadelphia lawn mower; three sizes hand machines; No. 0, 10 inches cut, price fifteen dollars; No. 1, fifteen inches cut, twenty-five dollars; No. 2, twenty inches cut, thirty five dollars; two sizes for horse-power; No. 2½, thirty inches cut, seventy-five dollars No. 3, thirty-six inches cut, $150

1188. Landers, Frary & Clark, New York, by Wright, Dana & Company, Utica, N. Y.; the Landscape lawn mower; price twenty-five dollars.

A lawn mower that can be worked by the force of one man has long been wanted in this country. It is true there were English machines adapted to this purpose, but when the expenses of importation were added to the first cost, they came so high that comparatively few of our people could afford to purchase them.

The trial of the machines above mentioned has demonstrated the fact that lawn mowers are made in this country which will do the work required of them in a satisfactory manner, and that they are afforded at prices which bring them within the reach of most persons who have occasion to use them. Almost every house has, and every house except those in dense cities should have, a grass plat attached to it, which, when kept in proper order, adds greatly to the attractiveness of the premises. One reason, probably, why they are so frequently neglected and become *blemishes* rather that embellishments, has been the trouble of keeping them in proper condition. This trouble is greatly diminished by the use of a good hand lawn mower. If the

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ground is made smooth in the first place and kept sufficiently condensed by the frequent use of the roller, it is little more than a pastime to push one of these machines over it as often as the grass becomes grown enough to allow an inch or two to be cut off. On larger tracts, which may with more propriety be called lawns, larger machines, drawn by a horse or donkey, will be more economical.

The merits of the machine of Chadborn & Coldwell, and that of Graham, Emlen & Passmore, seemed to the committee so nearly balanced that it was not easy to decide the question of superiority. In ease of running in proportion to work done, there was no perceptible difference when both were in good order. The latter has all its gearing closely boxed and protected from dust. The cut grass may either be left on the ground, as with the other machines, or by a simple attachment it may be gathered up as cut, leaving the ground entirely clean.

The committee awarded to Graham, Emlen & Passmore, a bronze medal, and to Chadborn & Coldwell a certificate of merit.

CORN HUSKERS.

No. on catalogue.

1086. Jacob Russell, 16 Water street, Brooklyn, N. Y.; Russell's improved corn-husker for husking corn as cut from the hill or picked from the stalk; No. 1, weighs 800 pounds price, $150.

1087. L. Augustus Aspinwall, Hudson, N. Y.; Aspinwall's patent corn-husking machine, patented April 12th 1870; to be driven by one or two horses; capacity 300 to 400 bushels per day; delivers husks underneath, stalks in front, for binding, and corn in the rear of machine; weighs 525 pounds; price, $100.

A machine under the charge of Peter Philip, called "The Empire Spiral Corn-husker," not regularly entered, was allowed to compete for the prize, no objection being made by the other competitors. The proprietors of the Aspinwall machine allege that the Empire Spiral is an infringement on their patent.

The numerous attempts to husk corn by machinery may be said to have been failures till lately, so far as regards practical results. The work performed by the three machines brought before the committee indicated that, with such modifications, as use would suggest, all might be made to work with success. At this time they present various degrees of merit in reference to their adaptability to the purpose in view. They were all fitted for horse-power, but on the present occasion were run by steam. Aspinwall's was of the size adapted to one horse; the others to two horses. The corn with which they were tried was in shock, but had been cut up only a few days, and was not

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as dry as corn usually is when husked. It was an eight-rowed yellow flint variety. When the machines were not forced, the corn was pretty cleanly husked. Aspinwall's machine did not shell the corn at all; Russell's shelled some, and the Empire Spiral more, so much as to constitute a decided objection.

The manner in which the stalks were left deserves notice. The usual mode, when corn is husked from the shock, is to re-shock the fodder in the field. When the fodder is sufficiently dry, however, it is sometimes bound in bundles and put into stacks None of the husking machines left the fodder in such condition as would admit of its being set in shocks to advantage; the stalks were too much crippled to stand up well. They were left in the best order, in respect to this, by Aspinwall's machine. With a little attention by the man taking the fodder from the machine, it could be kept so straight and even as to be readily made into bundles. With the other machines this would be more difficult. The Empire Spiral completely crushed the stalks, and left them so crippled and doubled that the only ready means of disposing of them would be to take them away with forks. If they were to be packed in bulk, a question arises as to the effect of crushing. In the green condition the stalks of the corn husked at this time were, it is likely the juices would soon sour, and the quality of the fodder be more or less injured as a result. If, however, the stalks were quite dry, no fermentation would take place; but the objection would remain that the fodder was not in a condition to be conveniently handled.

The force required to manage such machines, is one man to place the unhusked corn on the platform, one to feed, and one to take away the fodder. In this trial, Aspinwall's machine; being of the smaller size, the labor of attendance was somewhat lighter; but, if his two-horse machine had been used, corresponding in size to the others, the labor must have been about the same.

The following summary shows the amount of work that would be done by each machine in ten hours, the force and rate of speed being the same as during the trial before the committee.

Aspinwall..... 3 men and 1 horse, husks 190 bushels.
Russell ..... 3 men and 2 horses, husks 217 bushels.
Empire Spiral, ... 3 men and 2 horses, husks 223 bushels.

With the same size of machine, the performance of the Aspinwall would probably exceed that of either of the others.

The committee award for Aspinwall's machine the bronze medal, and for Russell's a certificate of merit.

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REVERSIBLE OR SWIVEL PLOUGHS.

The committee found, after meeting at Utica, that various entries of ploughs had been made. On consulting with Mr. Geddes, the officer having the general charge of the implement department, and with Mr. Harison, the Secretary of the Society, it was decided to proceed with a trial of reversible ploughs, and to test such improvements in other ploughs as have been made since the Society's trial at Utica, in 1867. For reversible ploughs the competing entries were as follows:

No. on catalogue.

1012. F. F. Holbrook & Company, Boston, Mass.; Holbrook's No. 4; sod two-horse swivel plow, wheel and moveable cutter; weighs 148 pounds; price, twenty dollars; and No. 4½ extra stubble mould-board, share and dog; weight fifty-four pounds; price, seven dollars; and No. 7 A, sod mould-board, share and dog; weighs fifty-nine and one-half pounds; price, eight dollars, for use on same.

1015. L. D. Burch, Sherburne, N. Y.; the Chenango Clipper reversible plough, for side-hill and level land; for all conditions and kinds of land; weighs 110 pounds; price, fifteen dollars.

1017. Josiah Seymour, Bainbridge, N. Y.; a two-horse reversible plough, designed for level land; weighs 144 pounds; price, fifteen dollars.

1023. Ford Brothers, Oneonta, N. Y.; reversible plough for flat land; patent applied for by E. C. Hodge; weighs 125 pounds; price, fifteen dollars.

It was decided to try these ploughs on both sod and stubble ground. Lots 41 by 75 feet were laid out for the former, and 30 by 200 feet for the latter. The lots on the sod were as nearly alike in regard to the character of the soil, and all the conditions that would affect the performance of the work as it was practicable to have them. Still, the two taken by Seymour and by Ford Brothers, lying a little on the side of a knoll, proved to have a somewhat thinner soil, and to have more cobble stones within reach of the ploughs. The lots taken by Holbrook & Company and by Burch were so nearly alike that no advantage in favor of either could be seen. The stubble lots were nearly alike. The competitors were directed to plough one-half their *sod* lots six inches deep, and the other half seven inches. The reason for this was that, in the opinion of the committee, a sod plough should be capable of ploughing at least seven inches deep. In regard to width, the competitors were informed that, other circumstances being equal, furrows not over a foot wide would be preferred to wider ones, narrow furrows effecting more friability of the soil.

The tests of draught with dynamometer for sward were all made on one lot and with one team, in order to secure the greatest practicable uniformity of conditions. Table I shows the results. Dynamometer tests were also made on stubble; but as they were made on

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the different lots ploughed, they could not have been as decisive in reference to what the draught would be under the same circumstances, as were those on sward and the results are therefore omitted.

TABLE I.

Results of trial with dynamometer of reversible ploughs, on green-sward at Utica, September 17 *and* 18, 1870.

NAME OF PLOUGH.	Weight.	Price.	Length of furrow in feet.	Width in inches.	Depth in inches.	Section inches.	Mean draught. lbs.
Holbrook	152	$20	210	15	8	120	666
			210	14	7	98	597.2
			205.5	14	6.48	90	595
			198	13	6	78	499
			198	13	6	78	490 *
Ford	125	15	204	15	8	120	674
			205.5	14	7	98	558
			202.5	13	6	78	496.5
Burch	100	15	204	14	7	98	667.6
			202.5	13	6.4	83.2	563
Seymour	144	15	198	14	7.3	102.2	734.2
			199.5	13	6.4	83.2	669.5
			201	13	6	78	618
Herstine Revolving Disc	....	....	144	12	6	72	531

The rules by which the committee were chiefly governed in their decisions may be stated as follows: (1.) The character of the work done. (2.) The force required to perform it. (3.) The character of the plough in reference to durability, and its actual value in proportion to the price at which it is sold.

On the first point it may be said that the general object of ploughing is to produce a seed-bed, and the nearer the work done approaches to the required condition for that object, the better it is deemed to be. It is true that the variation of soils in regard to tenacity and looseness, or heaviness and lightness, renders it expedient to modify somewhat the processes of tillage. The old maxim "Make heavy land lighter and light land heavier," expresses the object. While in the one case the plough should effect the greatest practicable pulverization, in the other, the soil being already too light, the aim should be to turn it over without increasing that defect. The condensation of such soil, though in some instances desirable, would not probably be practicable by the act of ploughing.

On the present occasion no opportunity was offered to try the ploughs on soil needing condensation. The sward-land and most of the stubble assigned for the trial, was what may be called a stiff loam. It is much more important that a test of ploughs should be made on such

* Change of cutter.

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soil than on that of a lighter character. To obtain a plough that will turn the heavier class of soils in the best manner, in reference to effecting their friability, is the great desideratum. The cultivation of light soils is not difficult. Ploughs have been long in use by which they can be very well tilled; though, of course there is a particular form that is best adapted to the work.

It is proper to remark that ease of draught is by no means the most essential requisite in ploughing stiff soils, or such a soil as that on which this trial was made. The plough which would draw the easiest would effect very little pulverization. It would simply cut and turn a furrow-slice without disturbing the particles of earth of which it is composed. The seed-bed, which is the aim, requires disintegration; such a breaking and loosening of the soil as will permit heat to penetrate it readily, and at the same time allow the free extension of the roots of plants. Force is obviously required to effect this; but we seek to accomplish the most in this direction in proportion to the power expended.

In ploughing sward we cannot effect that thorough pulverization which can be secured on what is called "old land," or that on which there is no vegetation; the furrow-slice must be so disposed that the vegetation will immediately die and decay. Grass that is not shut out from the light will grow, and of course its growth will interfere with the crop it is intended to cultivate. We must not break the furrow-slice as much as we may where there is no vegetation, because that would leave more or less grass in a position to grow. The two-fold object of destroying the vegetation as quickly as possible, and of leaving the inverted soil in the most friable condition, must be kept in view.

The angle at which the furrow-slice is left is not of so much importance in reference to friability as is sometimes supposed. Some ploughs which leave the slice at a high set do not leave it as light as others which effect a greater inversion. This was very strikingly illustrated at the trial of ploughs held at Albany, under the supervision of a committee of the New York State Agricultural Society, in 1850. A delegation from the committee visited and examined the ploughed lots two weeks subsequent to the trial. The ground had purposely been left untouched from the time it was ploughed. On the stiff land some of the lapped furrow-slices were so hard that a man could walk along the corners or edges without breaking them. The soil, in these cases, had been compressed rather than lightened, by ploughing, and lay heavy and inert, although the spaces between the furrows were full of

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growing grass. There were other lots on the same kind of land, where, though the furrows were turned more flat, the soil was much more friable; in the language of the committee, "left beautifully open and light, while the grass was so completely covered as to prevent its growth." This latter style of work was deemed decidedly preferable to the former. The condition of the inverted soil depends on the shape of the plough, as determining the manner of cutting, raising and turning the furrow-slice, rather than on the angle at which it is left. For this reason your committee made no particular specification in reference to the latter point, preferring to form their opinion in respect to the friability of the soil, by the evidence which the work itself presented.

We are aware that certain advantages are claimed for lapped furrow-slices, or those set at a high angle. It is said that on land which is liable to be too wet, the spaces under such furrow-slices serve as channels for drainage, and that consequently the land will remain lighter and in a better condition for crops. In reply to this, it may be stated that this kind of surface drainage is objectionable from the loss of fertilizing elements which the water would carry away. When water sinks directly into the earth, as it does where there is proper under drainage, the fertilizing matter is taken out and retained by the soil. Surface currents, on the contrary, wash out the fertility of the soil, more or less. Such drainage can only be tolerated as a makeshift, until a better system can be adopted.

It is admitted by the general mode of English and Scotch ploughing, the furrow-slices have a pretty high set, even on sward. But it should be remembered that English and Scotch ploughing is done in much narrower furrows than are usually made by our farmers. With a furrow only nine or ten inches wide, set at a high angle, the harrow will cut down and pulverize a much larger portion than one of a foot or more in width. With wide lapped furrows, the harrow of common form only works down the upper edges; it will not take hold of the lower parts till the higher are beaten down, and, of course, the cavities which had been formed under them chiefly filled by the pressure, thus destroying what has been supposed to be the principal advantage of this mode of plowing.

But it should be remarked that the English and Scotch farmers do not recognize the alleged advantage of a space under the furrow-slices. They give the high set for the purpose of obtaining loose earth to cover the grain to be sown on the land. They do not want any open space underneath, and to prevent it they use a heavy iron

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"presser" with beveled ridges to fit the furrow-slices and press them down to the subsoil, leaving the comb of the slice as perfect as before. Grain sown broadcast on a field prepared in this way, falls into the hollows at the junction of the furrow-slices, and is readily buried by the harrow which is drawn over the field. The explanation for thus pressing the furrow-slices is, that wheat, oats, etc., grow better where they can obtain a firm root-hold. In this country it is common to plant Indian corn as the first crop on broken sward, and the objections to a space under the furrow-slices are not as obvious as in the case of wheat.

We have alluded to the difficulty of properly pulverizing sward-ground furrow-slices with the ordinary harrow. A word more in this connection seems necessary. It is sometimes said that it is not of much consequence if sward-ground is turned with a heavy furrow-slice and without pulverization, as the requisite tilth can be subsequently obtained by the use of the harrow and other implements. So far as pulverization is effected by the harrow, it is confined to a very slight depth, below which it condenses the soil. Road makers know that the harrow is one of the best tools they can use to pack the loose earth. It is on account of this action that other implements have been substituted for the ordinary harrow in preparing sward-ground for a crop. The disk harrow of Nishwitz operates in a very different way. It loosens all the soil it reaches without condensing that below its track. The tendency, however, in dragging so heavy an implement over the ground would be to fill any vacancies there might be between the ploughed portion and the substratum, so that its use on lapped furrows would counteract to a great extent one of the chief advantages claimed for that mode of ploughing. The implement would effect equal pulverization on furrows not lapped, and leave behind it a more uniform surface.

After the sward ploughing was done, the committee walked over the different lots and carefully observed the condition of each in respect to the uniformity with which the furrows were cut and turned, the grass in sight, and the lightness and friability of the furrow-slices, as shown by their appearance to the eye and their yielding to the pressure of the foot. The conclusion arrived at was that the lot ploughed by Holbrook & Company was in the best condition. Breadths were then harrowed through the different lots and the effect of the operation noted. The perfection of the work corresponded to the previous relative condition of the lots.

It will be seen from the table that the draught of the ploughs was

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tested on sod at depths of six, seven and eight inches. The test at the latter depth was made at the request of several of the competitors, and agreed to by all. It was thought important that the full capacity of the ploughs should be known.

After completing the tests on sod, the committee proceeded to try the same ploughs on stubble. The four competitors previously named appeared on the ground, and all ploughed the lots assigned to them, with the exception of Burch. He made various ineffectual attempts to adjust his plough to the work required, but finally withdrew from the contest without having made a fair beginning.

The stubble-ground had produced a pretty large crop of weeds, which the competitors were directed to bury in ploughing. The character of the work on the three lots ploughed, was very good. The committee considered the proper standard to be, the greatest amount of pulverization in connection with thorough covering of the vegetation, and on this ground give the preference to the work done by Holbrook & Company. The other ploughs, and particularly Seymour's, left the furrow-slice more cloddy.

In reference to the workmanship and durability of the competing ploughs, it may be said that all were good, so far as relates to quality of materials and finish. In adjustability, or adaptation to different kinds of work on different soils, that of Holbrook & Company has the greatest range. Five different mould-boards are made which can be readily attached to the plough used in this trial. The mould-boards are numbered 4, 4½, 5A, 6A, and 7A. The following is a description by the inventor, ex-Governor Holbrook, of Vermont, of the purposes in which these mould-boards are adapted.

"No. 4 is long slim, and very easy running; adapted to sod, and working four to eight inches deep and ten to fourteen inches wide. It is best adapted to not over stiff soils, and those not very stony or cobbly. In lightness of draught it excels all other two-horse swivel plows with which it has been tried.

"No. 4½ is a stubble mould-board; works very satisfactorily, and in New England is considered superior to any of our other swivel plows for stubble.

"No. 5A, is a good sod or stubble plough for all that class of rocky and stony land, with considerable roughness and unevenness of surface, which we find in some parts of New England. This mould-board has a very short and powerful twist, and is sure to invert whatever of a furrow-slice it can get under, and enters the ground quickly if from any cause it is thrown out. But for good, free and smooth

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ploughing it is not as desirable as either of the other mould-boards.

"No. 6A, is a 'rough-and-ready' two-horse plough for sod or stubble; works four to seven or eight inches deep, and twelve to fourteen inches wide. It is much liked by those of our New England farmers who desire to do all ploughing with one plough. But being about equally good for both sod and stubble, it is not quite as good for either alone as though it had been made specially for one or the other.

"No. 7A, which was used at the recent trial at Utica, is a two or three-horse sod plough, working, as we usually rate it, six to nine inches deep, and fourteen to sixteen inches wide. But it really has very great range or capacity, working well from four to nine inches deep, and ten to eighteen inches wide. In bog meadow it turns a sod furrow-slice eight to nine inches deep, and sixteen to eighteen inches wide. In that kind of ploughing it is necessary to turn at least twice as wide as the depth, to be sure of always inverting the sod and completely covering the wild grass.

"There are places where we prefer the 7A, to the No. 4, for two-horse sod work, and there are other places where we prefer the No 4 to the 7A for such work. We always mean to have both mould-boards with us, and then, as they both fit the same plough, we use the one that will do the best work, in the particular condition of things we find. In a smooth, free, loamy soil, or in a sandy loam, with the comparatively tender sod commonly found on that kind of land, the No. 4 is an admirable sod plough, answering to the place among our swivels that No. 65 (or 95) does among our land-side ploughs. But in stiff and rugged soils, like the sod at Utica, with more or less cobbles in the hard under soil, we prefer the No. 7A to No. 4, and in such a place the 7A runs quite as easily as No 4, but not so in the other soils to which the latter is peculiarly adapted."

It is proper to state that in rigging the 7 A plow for bog meadow work, it is fitted with a cast-steel share and Holbrook's patent clevis, with side draft rods, which allow the team to travel entirely on the unploughed ground. It should also be stated that for all sod work, this plough is fitted with Holbrook's patent cutter and stock. By this contrivance the cutter is made to vibrate from one side to the other with the revolution of the mould-board, by which it is placed in exact line with the land-side of the plough, whether turning a right or left hand furrow. The cutter is very simple, is self-cleaning, and is thought to be stronger, more durable, and of lighter draft than the common cutter. The convex form of mould-board has been adhered to in these

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ploughs, especially in 7 A. The furrow-slice is made to take a considerable rise on the breast of the plough, and is then gradually turned over, the friction being evenly distributed over the wearing surface. This form cracks and opens the furrow-slice throughout its whole thickness, and leaves it in that mellow condition before described.

The plough of Ford Brothers, had two cutters, one on each side of the beam, one to cut the left-hand and the other the right-hand furrow. At the end of every furrow it is necessary to turn up the cutter last used to a place provided for it beside the beam, and let down the one on the opposite side to cut the next furrow. The hinge or turn-wrest of this plough is placed about three inches above the sole, by which it is claimed that the change of the mould-board from one side of the beam to the other, is rendered easier than when the hinge is near the line with the base of the sole, as it usually is. A spring latch catches on the upper edge of the mould-board and holds it in its place, as soon as it is turned, thus saving the time required to fasten it with a hook, as is done in most other ploughs. This plough raises the furrow-slice but little, and turns it without effecting much pulverization. It appears to be substantially made.

Mr. Seymour's plough is still more on the concave plan than that of Ford Brothers, and the compression of the furrow-slice by the mould-board probably accounts, in a material degree, for the heavy draught of the implement, as shown by the table. On the dryest part of the sward-ground it effected considerable pulverization, but it was evidently at the expense of too heavy draught; and if the ground had not been dry the furrow-slice would have been packed, instead of crumbled, by the compression above alluded to.

Mr. Burch's plough is of the same pattern, apparently as that used by him in the Utica trial of 1867. It is light, as will be noticed on comparing its weight as given in the entry, with that of the other ploughs; and of course its wearing parts have less durability than they would have with more substance. It is concave rather than convex; and the same fact was obvious in regard to its operation that was prominently shown at the former trial, viz., that it did not work well at a greater depth than six inches. The table of results by the dynamometer shows that its draught was greater than that of the ploughs of Holbrook & Company and Ford Brothers at six inches deep, and strikingly so at seven inches. Its draught was not tested at eight inches, as it proved to be incapable of working properly at this depth, notwithstanding that Mr. Burch requested, before the trial, an eight inch test. When tried at seven inches and deeper, the upper part

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of the mould-board pressed with much force against the furrow-slice increasing the draught, and leaving its mark plainly. This pressure is very objectionable on tenacious soils, causing them, except when very dry at the time they are ploughed, to be glazed over and become hard.

The committee unanimously award to F. F. Holbrook & Company a bronze medal, and to Ford Brothers a certificate of merit.

Under the head of improvements in ploughs, the attention of the committee was called to the implement specified in the following entry:

No. on catalogue.

1024. Godfrey & Loveridge, Pittsburgh, Pa., by D. W. Herstine, Philadelphia, Pa.; Godfrey's revolving mould-board plough, having a steel concave disk in the surface of the mould-board, revolving with the friction of the furrow-slice; weighs 134 pounds; price twenty-eight dollars.

This plough was tried on the same land as the reversible ploughs, and the draught, as shown by the dynamometer, is appended to the tabulated results. The work done with it was not such as would be satisfactory to any good farmer. The furrow-slice was generally merely split off and left on edge, without pulverization. It is said the plough was made chiefly for the prairies, where it may, perhaps, be used to better advantage.

AN IMPROVED EVENER.

Before leaving the subject of ploughs and ploughing, it is proper to notice a new evener brought to the attention of the committee by Messrs. Holbrook & Company, and patented, as understood, by a member of that firm. It was used on their plough, and was much liked by every one who saw it. A particular description will not be attempted. It is sufficient to say that it entirely obviates the trouble of horses stepping over the traces in turning. It is light, strong and not expensive.

ENDLESS-CHAIN OR RAILWAY HORSE-POWER THRESHING MACHINES.

No. on catalogue.

883. Wheeler, Melick & Company, Albany, N. Y.; Wheeler's thirty-inch cylinder thresher and cleaner for two-horse railway power; weighs 1,200 pounds; price $235.

884. The Albany Agricultural Works, Albany, N. Y.; thresher and cleaner; cylinder fourteen by twenty six inches; weighs 800 pounds; price $202.50.

886. Martin Williams, St. Johnsville, N. Y.; thresher and cleaner; weighs 1,000 pounds; price $200.

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Table I. contains the data observed and recorded during the trials of the different machines.

Tables II, III and IV contain the deductions from tables I and VI.

Table V contains a summary of the average results deduced in II, III and IV. The columns headed "Work done," contain the absolute rates of threshing and cleaning the grain, in all the trials. There is, therefore, no necessary relation or connection between these quantities and those contained in the remaining columns, which represent average values of power expended.

Table VI contains the results of the observations upon the friction-brake, made for the purpose of ascertaining the total power expended by the horses in each case, the manner of its distribution, and, ultimately, the efficiency of the machine.

The power developed by the horses was determined by multiplying their weight into the vertical height due to their motion and the inclination of the plane upon which they walked. The weight and inclination were uniformly 2,140 pounds and 15° respectively. Representing the speed of the horses, in feet per minute, by v, the total power developed in any case will be represented by the formula:

$$\text{H. P.} = \frac{2140\ v \sin. 15^\circ}{33000}$$

In taking the indications of the friction-brake, the motion of the machine was, in each case, made uniform and equal to nearly an average of the motions when threshing, in the different tests.

This condition having been established, the tendency of the brake-lever to revolve, was measured by a spring balance, which was uniformly placed at a distance of two feet from the axis of the pulley. Two tests were made in the case of each machine.

First. The entire power, transmitted through the horse-power, was absorbed in the friction of the brake, and measured by it; and, Second. The brake being interposed between the horse-power and the thresher and separator, which latter was run by a belt from a pulley upon the shaft of the brake-pulley. The motion was then adjusted by clamp-screws upon the brake.

The transmitted power, which had previously been measured, was then expended, partly in running the thresher and separator, and partly in overcoming the friction of the brake; the latter part being evidently equal to that which would have been available for threshing and cleaning grain, had not the brake been in operation.

The difference between the indications of the spring balance, in the two cases, was an index of the power required to run the thresher and

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separator, as it was due wholly to the thresher being disconnected in one case and connected in the other.

If, then, the tendency of the brake to revolve, be ten pounds, when the entire transmitted power is absorbed by it, and only seven pounds when the thresher and separator are running empty, the motion being the same in each case, we shall have the following indices of power, viz.:

1. Total power transmitted..... 10
2. Power absorbed in running thresher and separator..... 3
3. Power available for threshing and cleaning grain..... 7

The estimate of the absolute power in each case is made as follows:

Let t = tendency of brake to revolve; or the indication of the spring balance.

r = number of revolutions per minute of the brake-pulley.

l = lever arm of the brake, two feet.

Then, generally,

$$\text{H. P.} = \frac{2\,\pi\,l\,r\,t}{33000} = \frac{2 \times 3.1416 \times 2\,r\,t}{33000} = 0.00038\,r\,t.$$

If the number of revolutions of the brake-pulley be put at 500, we shall have, in the case assumed:

1. H. P. = 0.00038 × 500 × 10 = 1.90 horses.
2. " = 0.00038 × 500 × 3 = 0.57 "
3. " = 0.00038 × 500 × 7 = 1.33 "

Now let it be assumed that the horses weighed 2,000 pounds, and traveled upon a surface the inclination of which was 15°, and at the rate of one and one-half miles per hour, or 132 feet per minute. The power developed by the horses, under these conditions, was therefore,

$$\frac{2000 \times 132 \times \sin.\ 15^\circ}{33000} = 2.07 \text{ horses.}$$

The difference between the power expended by the horses and that transmitted; or, 2.07 — 1.90 = 0.17 horses, evidently represents the power absorbed in the friction of the horse-power; and hence we have, finally:

Total power expended	2.07 horses.
" transmitted.....	1.90
" utilized in threshing and cleaning	1.33
" absorbed in friction of horse-power	0.17
" absorbed in friction of thresher and separator	0.57

and the ratio of the power utilized to that expended, or the efficiency of the apparatus = $\frac{1.33}{2.07}$ = 0.645.

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This example is given as an illustration of the method by which the results contained in Tables II, III and IV, have been obtained; it being deemed impracticable to reproduce here all the computations made in the construction of the tables.

It should be further remarked, however, that, inasmuch as the number of revolutions of the friction-brake pulley differed somewhat, in each trial, from that which obtained during the "power test," the revolutions of the brake-pulley, due to the observed resolutions of the cylinder, were, in each case, carefully computed, and the necessary corrections made.

Upon an examination of the tabulated results, an apparent anomaly will appear in the fact that the quantity of grain threshed and cleaned by the machine of Messrs. Wheeler, Melick & Co., in a given time, was considerably greater, while the power expended by the horses was only slightly greater, than that of the Williams machine to which the bronze medal was awarded.

This we explain upon the hypothesis that a high rate of speed is more favorable to the rapid passage of the straw through the cylinder than a low rate; and that while the capacity of the cylinder to pass the straw bears some relation to its speed, and varies nearly with it, the power required does not increase in the same ratio.

Again, the unavoidable irregularities in feeding produce less effect upon the motion of a cylinder revolving rapidly, other things being the same, than upon a cylinder revolving more slowly. In short, it appears that it requires, within certain limits, less power to thresh and clean grain at high than at low speed.

In this view of the case, it might seem that the award should have been made to the Wheeler & Melick machine. But it must be remembered that the condition of the grain, and the quantity produced from a given quantity of straw, are quite as important as the absolute quantity threshed.

It should be stated also, that while the Williams machine employed four men, that of Wheeler & Melick employed five. In the Wheeler & Melick machine the motion was so rapid that many grains of the wheat and rye were crushed; while in the case of the oats, both loose and in bundles, the diminished production, as compared with that of the other machines, gives rise to the suspicion that not a small quantity of grain was blown over with the straw and chaff. If the high rate of speed of the Wheeler & Melick machine be admissible, or even desirable, it may be obtained in the Williams machine by the substitution of a smaller cylinder pulley and without effecting its

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general construction or its efficiency in the utilization of power, which latter constitutes a prominent feature of its excellence.

An important fact disclosed by this trial ought to be mentioned, and ought also to receive the careful consideration of the builders and operators of these machines. It appears, upon an examination of the columns of "Total Power Expended" by the horses, that the average power developed was about 1.3 horse power for each horse; varying between 1.15 as the minimum and 1.45 as the maximum.

In order to convey an intelligible idea of the severity of this labor, and to indicate its effect upon the horse, let us institute a comparison between threshing and ploughing greensward.

The draught of a good plough, in greensward, when cutting a furrow six inches deep by thirteen inches wide, is about 500 ponuds or 250 pounds per horse. Now, in order to develop a power of 1.3 horses, the average upon the threshing machine, the horse must exert this force over a space of 176 feet per minute; or he must walk at the rate of two miles per hour. A team walking at this rate and ploughing a furrow of the width stated, would, in ten hours, plough two and five-eighths acres of land. It seems scarcely necessary to state that this is entirely beyond the endurance of our best horses.

The committee award to Martin Williams the bronze medal, and to Wheeler, Melick & Company a certificate of high merit.

LARGE THRESHING MACHINES.

No. on catalogue.

880. H. Birdsall, Son & Company, Penn Yan, N. Y.; grain thresher and separator for steam-power; weighs 2,600 pounds; price $465.

882. Wheeler, Melick & Company, Albany, N. Y.; Geiser patent thresher and separator mounted on truck, with straw-stacker and grain register; weighs, 3,000 pounds; price $465.

These machines were tried with wheat and rye only. On account of the impracticability of procuring the requisite number of horses, and especially in view of the fact that the Albany machine was designed to be driven by steam power, both were driven by a Wood & Mann portable ten-horse engine; and the sweep-power belonging to the Penn Yan machine was left untried. The latter was inspected, however, and found to be a strong, well constructed, and evidently durable machine. It was provided with five sweeps, and designated a ten-horse machine.

Tables VII and VIII contain the observed results of the trial of the threshers and separators:

The engine by which these machines were driven, not having been

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provided with an indicator, there was no opportunity for a precise, or even an approximate, estimate of the power expended upon the respective machines. Tables IX and X, however, show such facts as were apparent and could be recorded.

The power of the engine so far as it depended upon the steam-pressure and revolutions, did not, as appears in the above record, differ materially in the several trials; but the *quantity* of steam used, being governed by the position of the throttle, the extent of the opening of which could not be ascertained, was, of course, indeterminate; and, hence, no attempt has been made to estimate it. It was, however, clear that, during the trial of the Wheeler & Melick machine, the engine was giving out very much more power than was expended in running the Birdsall machine. Other things being so nearly equal, the opening of the throttle was, of course, the principal index of this fact.

The object of the managers of the Wheeler & Melick machine seemed to be to show their ability to thresh and clean more grain in a given time than their competitor, without reference to the economy of the performance; while the managers of the Birdsall machine claimed only to run their machine as they would under ordinary circumstances, and with a view to subserve at the same time their own interest and that of the farmer. Not only was the power greater in the case of the Wheeler & Melick machine, but the number of men required to attend the machine was also greater, six, instead of five with the Birdsall machine, without however, being able to maintain anything like uniformity in its action.

In view of all the facts, the committee were impressed with the opinion that the increased performance of this machine was not commensurate with the great excess of force required to run and attend it.

A novel feature in this machine was the use of a simple blast for effecting the separation of the grain from the straw and chaff. To accomplish this, the fan was run at about double the ordinary speed and thus absorbed from eight to ten times as much power as is ordinarily required to run the fan. On the whole the committee was not satisfied that this mode of cleaning grain from the chaff is superior to that commonly used.

The committee award to H. Birdsall, Son & Company the bronze medal and to Wheeler Melick, & Company a certificate of merit, for threshing machines run by steam; and to H. Birdsall, Son & Company a certificate of merit for their ten-horse sweep power machine.

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TABLE I.

Observed data.—Trial with wheat.

Name of Machine.	Cylinder. Length.	Cylinder. Revolutions per foot of motion of horses.	Cylinder. Revolutions per minute.	Speed of horses in miles per hour.	Weight. Of straw and grain.	Weight. Of grain.	Time in seconds.	Remarks.
	in.				lbs.	lbs.		
Emery's	26	7.32	1005.6	1.56	720	149	1882.75	Motion irregular and grain badly cleaned.
Williams'	30	8.49	1208.0	1.62	720	157	880.00	Motion nearly uniform, grain well cleaned.
Wheeler & Melick's	30	10.06	1548.0	1.61	720	152	714.00	Motion nearly uniform, grain well cleaned, kernels broken.
TRIAL WITH RYE.								
Emery's	26	7.32	1050.6	1.63	550	112	1203.00	Grain not well cleaned.
Williams'	30	8.49	1291.3	1.73	550	156	702.00	Grain well cleaned.
Wheeler & Melick's	30	10.06	1760.5	1.99	550	164	536.00	Grain well cleaned, some kernels broken.
TRIAL WITH OATS, IN BUNDLES.								
Emery's	26	7.32	1040.0	1.61	410	185	990.00	Grain not well cleaned.
Williams'	30	8.49	1418.2	1.89	411	186	622.00	Grain well cleaned.
Wheeler & Melick's	30	10.06	1692.5	1.91	409	167	428.5	Grain well cleaned.
TRIAL WITH OATS, LOOSE.								
Emery's	26	7.32	1034.8	1.61	440	158	976.75	Grain not well cleaned.
Williams'	30	8.49	1312.4	1.76	440	175	725.00	Grain well cleaned.
Wheeler & Melick's	30	10.06	1601.3	1.81	441	163	456.00	Grain well cleaned.

TABLE II.

Horace L. Emery's machine, manufactured at Albany Agricultural Works, Albany, N. Y.

Kind of Grain.	Bushels threshed and cleaned per hour.	Speed of horses in miles per hour.	Horse-Power. Utilized in threshing and cleaning the grain. Absolute.	Utilized. Per cent.	Expended in running the thresher and separator. Absolute.	Expended. Per cent.	Expended in running the horse-power. Absolute.	Expended. Per cent.	Total. Absolute.	Total. Per cent.
Oats, loose	18.20	1.601	0.922	38.9	0.995	41.9	0.456	19.2	2.373	100.00
Oats, in bundles	25.69	1.614	0.926	38.5	1.001	41.6	0.478	19.9	2.405	100.00
Wheat, in bdles.	4 87	1.561	0.896	38.9	0.967	42.0	0.442	19.1	2.305	100.00
Rye, in bundles.	5.99	1.631	0.936	38.9	1.010	41.9	0.462	19.2	2.408	100.00
Totals	.....	6.407	3.680	155.2	3.973	167.4	1.838	77.4	9.491	
Means	.....	1.602	0.920	38.8	0.993	41.85	0.459	19.35	2.373	

REMARKS.—The horses weighed 2,140 pounds. The inclination of the horse-power was 15 degrees.

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TABLE III.

Martin Williams' machine, manufactured at St. Johnsville Agricultural Works, St. Johnsville, N. Y.

Kind of Grain.	Bushels threshed and cleaned per hour.	Speed of horses in miles per hour.	Horse-Power.							
			Utilized in threshing and cleaning the grain.		Expended in running the thresher and separator.		Expended in running the horse-power.		Total.	
			Absolute.	Per cent.	Absolute.	Per cent.	Absolute.	Per cent.	Absolute.	Per cent.
Oats, loose	27.15	1.753	1.534	59.2	0.766	29.5	0.295	11.3	2.595	100.00
Oats, in bundles	31.63	1.892	1.651	59.1	0.826	29.6	0.317	11.3	2.794	100.00
Wheat, in bdles.	11.35	1.618	1.429	59.8	0.698	28.8	0.271	11.4	2.388	100.00
Rye, in bundles.	14.29	1.739	1.509	59.1	0.754	29.5	0.290	11.4	2.553	100.00
Totals.....	.....	6.992	6.123	237.2	3.034	117.4	1.173	45.4	10.330	
Means.....	.....	1.748	1.531	59.3	0.758	29.35	0.293	11.35	2.582	

REMARKS.—The horses weighed 2,140 pounds. The inclination of the horse-power was 15 degrees.

TABLE IV.

Wheeler, Melick & Co.'s machine, manufactured at New York State Agricultural Works, Albany, N. Y.

Kind of Grain.	Bushels threshed and cleaned per hour.	Speed of horses in miles per hour.	Horse-Power.							
			Utilized in threshing and cleaning the grain.		Expended in running the thresher and separator.		Expended in running the horse-power.		Total.	
			Absolute.	Per cent.	Absolute.	Per cent.	Absolute.	Per cent.	Absolute.	Per cent.
Oats, loose	40.21	1.808	1.446	54.1	0.851	31.9	0.374	14.0	2.671	100.00
Oats, in bundles	43.85	1.913	1.495	53.0	0.879	31.8	0.449	15.2	2.823	100.00
Wheat, in bdles.	12.78	1.745	1.367	52.9	0.804	31.1	0.411	16.0	2.582	100.00
Rye, in bundles.	19.67	1.989	1.555	52.9	0.915	31.2	0.467	15.9	2.937	100.00
Totals.....	.....	7.155	5.863	212.9	3.449	126.0	1.701	61.1	11.013	
Means.....	.....	1.789	1.466	53.22	0.862	31.5	0.425	15.28	2.753	

REMARKS.—The horses weighed 2,140 pounds. The inclination of the horse-power was 15 degrees.

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TABLE V.

Summary of mean results.

NAME OF MACHINE.	Speed of horses in miles per hour.	WORK DONE. Bushels threshed and cleaned per hour.				HORSE-POWER. Utilized in threshing and cleaning the grain.		Expended in running the thresher and separator.		Expended in running the horse-power.		Total.	
		Loose oats.	Oats in bundles.	Wheat in bundles.	Rye in bundles.	Absolute	Per cent.	Absolute	Per cent.	Absolute	Per cent.	Absolute	Per cent.
Williams'	1.748	27.15	31.63	11.35	14.29	1.531	59.3	0.758	29.35	0.298	11.35	2.582	100.00
Wheeler & Melick's	1.739	40.21	43.85	12.78	19.67	1.466	53.22	0.862	31.5	0.425	15.28	2.753	100.00
Emery's	1.602	18.20	25.69	4.89	5.99	0.990	38.8	0.993	41.85	0.459	19.35	2.373	100.00

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TABLE VI.

Power test of machines.

NAME OF MACHINE.	Revolutions.		Pounds of Brake Lever.		
	Brake.	Cylinder.	When entire transmitted power was absorbed in brake.	When running thresher empty.	Difference due to power expended in running the thresher and separator.
			lbs.	lbs.	lbs.
Emery's	400	1066.7	13.0	6.25	6.75
Williams'	500	1333.3	12.3	8.2	4.10
Wheeler & Melick's	460	1635.6	13.5	8.5	5.00

TABLE VII.

Trial with wheat.

NAME OF MACHINE.	Cylinder.		Weight.		Time in seconds.	Remarks.
	Dimensions.	Revolutions per minute.	Of straw and grain.	Of grain.		
	in. in.		lbs.	lbs.		
Birdsall's	35 x 16¾	1351	2002	561	685	Grain well cleaned.
Wheeler & Melick's	38 x 14	1371	2092	575	558	Grain well cleaned.

TABLE VIII.

Trial with rye.

NAME OF MACHINE.	Cylinder.		Weight.		Time in seconds.	Remarks.
	Dimensions.	Revolutions per minute.	Of straw and grain.	Of grain.		
	in. in.		lbs.	lbs.		
Birdsall's	35 x 16¾	1342.1	2044	650	810	Grain well cleaned.
Wheeler & Melick's	38 x 14	1315.7	2848	863	765	Grain well cleaned.

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TABLE IX.

Threshing wheat.

NAME OF MACHINE.	Revolutions of engine per minute.	Pressure of steam. Average.	Throttle.	Remarks.
		lbs.		
Birdsall's	146.4	78.7	Slightly open	Motion nearly uniform.
Wheeler & Melick's	160.0	75.0	Nearly wide open.	Motion variable from irregular feeding; considerable grain carried over in the straw.

TABLE X.

Threshing rye.

NAME OF MACHINE.	Revolutions of engine per minute.	Pressure of steam. Average.	Throttle.	Remarks.
		lbs.		
Birdsall's	145.4	81.33	Slightly open	Motion nearly uniform.
Wheeler & Melick's	153.5	79.00	Nearly wide open.	Motion variable from irregular feeding; considerable grain carried over in the straw.

WOOD-WORKING MACHINERY.

No. on catalogue.

1126. Frank & Company, Buffalo, N. Y.; twenty-four inch pony planer; twenty inch pony planer; sixteen inch panel planer; prices, twenty-four inch, $140; panel, sixteen inch, $100.

These machines are compact, strong, durable, and very efficient. In view of the low price, small space occupied, and efficiency, the committee considered them very valuable. One of them reduced the thickness of a pine board, eighteen inches wide, from the thickness of one and one-fourth to three-eighths of an inch at a single cut, and planed one side of eight and one-third feet, board measure, in forty-one seconds.

The committee award Messrs. Frank & Company the bronze medal. No competition.

No. on catalogue.

1127. Davis & Gledhill, Albany, N. Y.; Davis' double slat planer, for planing blinds, slats and sash; planing both sides with the grain; weighs 900 pounds; three and one-half by two feet; price, $300.

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The machine worked well; planed nineteen lineal feet per minute. It is tasteful in design, well constructed, and easily managed. The committee award for it a bronze medal.

No. on catalogue.

1128. Davis & Gledhill, Albany, N. Y.; moulding machine, for sticking door or any other mouldings; weighs 800 pounds; five by two and one-half feet; price, $250.

The machine planed thirteen feet of two and one-half inch wide moulding stuff in one minute and eight seconds. It is entitled to similar remarks of commendation as those made in reference to entry 1127. The committee award for it a bronze medal.

No. on catalogue.

1129. Davis & Gledhill, Albany, N.Y.; sand-paper machine, for sand-papering doors, panels, or any flat surfaces; weighs 100 pounds; five by five feet; price. forty-five dollars.

A very ingenious, efficient, and useful machine for the purpose mentioned. The frequent renewal of the sand-paper is obviated by putting into the holder fifteen to twenty sheets at a time. The holder revolves in a horizontal plane about a vertical axis, mounted in a folding frame hung upon a vertical counter-shaft. It can be operated anywhere within a radius of four to five feet.

The committee deem this machine well entitled to the award of a bronze medal, which is made accordingly.

No. on catalogue.

1130. Daniel Doncaster, Albany, N. Y.; planing and matching machine, for planing, tongueing and grooving boards and planks; weighs 2,600 pounds; eight by four feet; price, $700.

Machine planes both sides, and cuts tongue and groove at the same time. Planed twenty feet board measure per minute. The committee award for it a bronze medal.

No. on catalogue.

1131. Daniel Doncaster, Albany, N. Y.; double sash and blind planer; weighs 800 pounds; four by three feet; price, $350.

The machine planed twenty-two lineal feet sash stuff per minute. Quality of work excellent. The committee award for it a bronze medal.

No. on catalogue.

1132. Daniel Doncaster, Albany, N. Y.; vertical re-sawing mill; weighs 3,000 pounds; twelve by four feet; price, $500.

1133. Circular re-sawing mill for clapboards and panels; weighs 1,000 pounds; four by four feet; price, $400.

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The machines specified in entries 1132 and 1133 are very useful and efficient for slitting thick stuff, or for cutting square timber into boards. They may be said to be *portable saw mills.* The committee award for each of them a certificate of merit.

The committee would remark that all of Mr. Doncaster's machines were characterized by simplicity, strength, and evident durability.

No. on catalogue.

1134. Read & Garton, North Brookfield, N. Y.; Read's hand planing machine for the use of cabinet makers, wagon builders, &c.; planes seven and one-half feet long and five inches thick, cutting with a disc; the machine travels over the timber; weighs 300 pounds; eight and one-half feet by twenty inches; price seventy dollars.

This is a very useful machine for small shops that are without power, or for the farm workshop. It is simple and durable, not liable to derangement, and requires no particular skill to manage it. The committee award for it a certificate of merit.

No. on catalogue.

1204. Jerome S. Mosely, Syracuse, N. Y.; scroll-saw machine for all kinds of ornamental scroll work; requires about one-half horse power in ordinary work; weighs 300 pounds; price $150.

This machine presents a novel method of attaching and detaching the saw to and from the frame. A very ingenious arrangement. The committee award for it a bronze medal.

No. on catalogue.

1222. Emmons & Company, Oneonta, N. Y.; William Mickel's patent machine for cutting out and chamfering cask and barrel heads; two sizes; power machine weighs 350 pounds; price $100; hand machine, 250 pounds, $75.

An excellent machine in design and workmanship, being simple and easily managed, at the same time doing its work perfectly. The committee award for it a bronze medal.

CARRIAGE-SEAT FASTENER.

No. on catalogue.

1276. J. H. Fellows, Alba, Bradford county, Pa.; Fellows' patent automatic seat fastener, patented May 4, 1869, for all carriages with movable seats; fasteners seventy-five cents; socket irons fifty cents.

1277. J. H. Fellows, Alba, Pa.; Fellows' patent improved automatic seat fastener, for carriages with movable seats; patented July 26, 1870; fasteners ninety cents; socket irons fifty cents.

This invention consists of a latch and socket iron, the former dropping into place when the seat is put into position, and securely holding it. When the seat is to be removed the fastener is readily detached by the hand. The committee looked upon this invention as

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quite convenient, but at the time of the examination thought it of scarcely sufficient importance to merit notice. Since the exhibition, however, one of their number came near losing his life in consequence of the seat of a carriage in which he was riding not being perfectly secured. A severe fall was the result, and in it was recognized a not very gentle reminder of what is now believed to have been a too hasty decision in regard to the fastener. It is to be hoped that the attention now called to the article may cause it to be appreciated.

STEAM ENGINES.

The Wood & Mann Steam Engine Company, Utica, N. Y., furnished the Society with a thirty horse-power stationary steam-engine, with adjustable cut-off, for the purpose of running the machinery on exhibition. The price of this engine is $1,350. They also furnish a ten horse-power portable "Agricultural steam-engine," which was used in running the large threshing machines tested by the committee. The weight of the engine is 5,500 pounds, and the price $1,300. The operation of both engines was highly satisfactory to the committee, and they award therefor the bronze medal.

PLANING MACHINE DUSTER.

No. on catalogue.

1198. McGannon, Granger & Company, Green Island, N. Y.; McClelland's planing-machine duster, for removing shavings and dust from wood working machines; weighs 600 pounds; price $500.

This appeared to the committee to be a very useful invention. Its effectiveness in reference to the object for which it was designed was demonstrated. It completely gathered all the dust and shavings from a large planing machine, and carried them sixty feet. It was evidently capable of carrying them much further. Besides thus getting rid of substances which are an encumbrance and obstruction to wood working machinery, the invention is promotive of the comfort and health of the workmen. The committee award for it a bronze medal.

MOWING MACHINE KNIFE GRINDER.

The only article presented for the examination of the committee under this head, was that entered (1138) by Charles C. Hardy, Rutland, Jefferson county, N. Y. It weighs 140 pounds; price, at retail, $5. This is a very simple thing, adjustable to any grind-stone in such a manner that one man can readily and quickly grind the knife perfectly. The committee deem it entitled to the award of the bronze medal.

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CASTOR WHEEL FOR REAPERS.

Under this head I. S. & H. R. Russell, of New Market, Maryland, entered (872) "an improved castor wheel for reapers," weighing seventy-six pounds; price $7.50. The committee are of the opinion that in many situations it would facilitate the turning of reaping machines, and prevent the breaking of the surface of the ground. They award for it a certificate of merit.

MOWING AND REAPING MACHINES.

The premium list of the Society specifies that a medal may be awarded for any improvement in mowing or reaping machines, invented or introduced since the trial at Auburn, in 1866, if "judged of real or permanent value."

Upward of forty machines were entered, but no particular specification was made in reference to any one for such improvement as the rules of the Society recognized. Some of the exhibitors, however, stated verbally to the committee that certain improvements had been made since 1866. But in a case of so much importance, the committee did not feel justified in making any awards without actual tests of the machines, which circumstances, too obvious to require special mention, prevented them from making. There can be no question that the trials which the Society has heretofore instituted, have had a very beneficial influence in bringing before the public the best machines in the country, and similar trials will undoubtedly be organized and carried out whenever they shall appear to be necessary. The tests to which machines are thus subjected, afford ground for awards that are entitled to confidence as representing comparative merit.

The committee, therefore, do not deem it necessary to enumerate all the improvements and advantages claimed by the exhibitors of different machines. They are generally set forth in the advertisements of the proprietors and become extensively known.

A point connected with rakes for reaping machines deserves mention. At the Auburn trial it became manifest that the automaton rake was about to supersede hand-raking in clearing the cut grain from the platform of the machine. Prominent among the rakes used for this purpose on that occasion was Johnston's, connected with the machines entered by C. C. Bradley & Company, and by Williams, Wallace & Company. In the report of the committee on that trial, the invention is spoken of as follows:

"The work of the Johnson [Johnston] rake excited much admiration on the ground. Its simplicity and easy adjustability are worthy

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of high commendation. Our objections to it were that it was not sufficiently strong, and did not work well when the wind was blowing. We see no obstacle to its being improved in these respects, and if this is done it will stand in the front rank of contrivances for aiding the gathering labors of the farmer."

The improvements suggested in the above extracts have been added, and the superior operation of the rake has been so generally acknowledged that it has been adopted for many other machines.

The "Reversible Mower" of J. F. Crawford, Syracuse, N. Y., patented January 11, 1870, was probably the latest novelty in this department. Its chief peculiarity consists in the cutting apparatus being so arranged that it can be worked on either the right or left of the body of the machine, being readily thrown from one side to the other. Various advantages are claimed for this invention, which, as before intimated, the committee had no opportunity of practically testing.

The machines entered by The Williams Mower and Reaper Company, Syracuse, N. Y., admit of a changeable speed; a fast speed for mowing and a slow speed for reaping. The plan is said to have been used on these machines two years with entire success. The difference in the rate of speed attainable is one-third, and the change can be quickly and easily made from the slow to the fast rate, and *vice versa*, without checking the speed of the team. It is found that all grain, and seventy-five per cent of grass can be cut with the slow speed; that the wear and tear of the machine is from twenty-five to thirty-three per cent less with the slow than with the fast speed, but whenever the latter is needed it can be had in an instant. The mode of effecting the change is very simple, and does not weaken the machine.

In regard to horse-rakes and hay-tedders, the committee took a similar view to that expressed respecting mowers and reapers, that as there was no way of properly testing them, it was inexpedient to make any awards.

SANFORD HOWARD,
D. M. GREENE,
AVERY A. SWEET,
H. F. FRENCH,
JOSEPH HARRIS,
DYER WILLIAMS,
Committee.

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REPORT OF THE EXECUTIVE OFFICER IN CHARGE OF THE IMPLEMENT DEPARTMENT.

To the Executive Committee of the N. Y. S. Agricultural Society:

At a meeting of the executive committee, held April 13, 1870, it was

Resolved, That the officer in charge of the implement department be empowered to require all or any of the exhibitors in that department to bring their implements and machines to Utica for trial, two weeks before the fair, and to convene the judges there for that purpose; and that no awards be made in this department without trial, or declared before the opening of the fair.

In accordance with the terms of the above, the undersigned, as officer in charge of the department, made the necessary preparations for the trial of agricultural implements at Utica, during the two weeks preceding the annual fair of the Society.

The following gentlemen were selected as judges, and duly notified to be in attendance at Utica, on the 10th day of September, to perfect the arrangements for the trial, which commenced on the 12th (Monday): Hon. Sanford Howard, of Michigan; Prof. D. M. Greene, Troy, N. Y.; Hon. Henry F. French, Concord, Mass.; Avery A. Sweet, Esq., Syracuse, N. Y.; Joseph Harris, Esq., Rochester, N. Y.; Dyer Williams, Esq., Syracuse, N. Y.

The judges assembled at the day designated and prepared a programme for the trial, which was carried out so far as circumstances would permit.

This being the first trial of the kind under the auspices of the State Society, it was exceedingly difficult to bring the exhibitors who for years have attended our annual fairs, to realize that promptness in making entries and personal attendance on the days of trial was absolutely essential to the success of the experiment, although circulars were prepared and issued, at an early date, to the exhibitors at former fairs, and to all the inventors and manufacturers of agricultural implements and machinery whose names and residences could be ascertained.

The programme devoted the days of the first week mainly to implements adapted to out-of-door or field trial, while the second week was mainly occupied by machines requiring power. The large building upon the fair grounds devoted to machinery was arranged and provided with steam power, shafting, etc., so as to accommodate all competitors and exhibitors at the trial.

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A very thorough examination was made by the judges, who labored untiringly day and night to give all an opportunity for exhibition of the various implements and machines upon the entry list.

For a detailed account of the labors of the judges, reference is made to their report, which will be made at length for the use of the Society. The undersigned, however, cannot refrain from bearing testimony to the zeal, efficiency and untiring industry exhibited by the judges, clerks and assistants during the whole time occupied by the trial. Thanks are also due to Mr. H. L. Emery, of the Albany Agricultural Works, for the use of the brake which he had made for the purpose, and which was used at the trial to determine the power developed by or required to run the various machines, and the per centages expended in friction, and utilized or made effective for work.

As an experiment and new feature in the policy of the Society, the trial was eminently a success. An universal expression of approval was given by the exhibitors in the mechanical department of the fair. and most emphatically by those who were interested in the trial itself.

Pecuniarily, of course, it was an expensive experiment for the Society; but the benefits arising from it may, in the future, outweigh all considerations of mere dollars and cents.

When the annual fair of the Society shall be permanently located or fixed, at two or more places in the State, so that the extra cost of fitting up machinery, etc., in each year will be avoided, there would seem to be no question as to the policy of making such trials permanent features attendant upon the annual exhibitions.

Respectfully submitted.

JAMES GEDDES,

Vice-President 5th District.

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AWARD OF PREMIUMS.

THIRTIETH ANNUAL EXHIBITION, HELD AT UTICA, SEPTEMBER, 27, 28, 29, 30, 1870.

CLASS I—CATTLE.

No. 1. SHORT HORNS.—SHORT HORN HERD PRIZE.

Wolcott & Campbell, New York Mills, N. Y.....Large Gold Medal.

Bull, "Royal Briton;"

Roan, calved July 26, 1868; bred by T. C. Booth, Warlaby, England; sire Lord Blithe (22126); dam Royal Bridesmaid, by Prince Alfred (13494); gr. d. Royal Bride, by Crown Prince (10087).

Cow, "Hope;"

Red and white; calved March 29, 1866; bred by exhibitors; sire Weehawken (5260); dam Lady Newham 2d, by Belmont (2533); gr. d. Lady Newham, by Bellville (6778).

Cow, "Bride of the Vale;"

Roan, calved January 6, 1865; bred by T. C. Booth, Warlaby, England; sire Lord of the Valley (14837); dam Soldier's Bride, by Windsor (14013); gr. d. Campfollower, by Crown Prince (10087).

Cow, "Fair Maid of Hope;"

White, calved February 4, 1865; bred by Richard Chaloner, Kingsfort, Ireland; sire General Hopewell (17953); dam British Maid, by British Prince (14197); gr. d. Village Rose, by Blood Royal (14169).

Heifer, "Baron Oxford's Beauty;"

Roan, calved March 11, 1868; bred by Colonel Townley, Lancashire, England; sire Baron Oxford (23375); dam British Beauty, by British Prince (14197); gr. d. Lady Abbess, by Cardinal (11246).

Heifer, "Rosamond 7th;"

Red roan, calved May 26, 1868; bred by exhibitors; sire Weehawken 5260; dam Rosamond, by Quarrington (10671); gr. d. May Rose 3d, by Bellville (6778).

Heifer, "Charming Rose;"

Red roan, calved February 23, 1868; bred by John Lynn, Stroxton, England; sire Garibaldi (17919); dam Clematis, by Sir John (12084); gr. d. Clementina, by Clementi (3399).

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Heifer, "Minaret;"

Roan, calved April 11, 1869; bred by T. C. Booth, Warlaby, England; sire King Richard (26523); dam Melissa, by General Hopewell (17953); gr. d. Melina, by Crown Prince (10087).

Heifer, "Frill;"

Roan, calved March 8, 1869; bred by exhibitors; sire Weehawken 5260; dam Rosamond 3d, by St. Nicholas 2d 4348; gr. d. Rosamond, by Quarrington (10671).

Heifer calf, "Fairy Queen;"

Red roan, calved December 23, 1869; bred by exhibitors; sire King Charles (24240); dam Jolly Queen, by Prince of the Empire (20578); gr. d. Vestal Queen, by Prince Alfred (13494).

SHORT HORNS—BULLS.

First prize bull, three years old, Walcott & Campbell, New York Mills, N. Y., 4th Duke of Geneva; red, calved August 6, 1867; bred by James O. Sheldon, Geneva, N. Y.; sire Baron of Oxford (23371); dam 7th Duchess of Thorndale, by 2d Grand Duke (12961); gr. d. 3d Duchess of Thorndale, by Duke of Gloster (11382)..... $50

Second, George Butts, Manlius, N. Y., Treble Gloster; red, calved March 31, 1867; bred by exhibitor; sire Apricot's Gloster 2500; dam Spring Beauty, by Apricot's Gloster 2500; gr. d. Silkie, by same bull..... 30

Third, V. W. Mason, Canastota, N. Y.; Seward; roan, calved August 25, 1864; bred by George Butts, Manlius, N. Y.; sire Apricot's Gloster 2500; dam Seraph, by Duke of Manlius 2773; gr. d. Sally Randolph, by Lord Ducie 662 10

First prize bull, two years old, Walcott & Campbell, New York Mills, N. Y., Royal Briton; roan, calved July 26, 1868; bred by T. C. Booth, Warlaby, England; sire Lord Blithe (22126); dam Royal Bridesmaid, by Prince Alfred (13494); gr. d. Royal Bride, by Crown Prince (10087)..... 40

First prize bull, one year old, Benjamin Fellows, Clifton, N. Y., Major; red, calved May 10, 1869; bred by M. H. Cochrane, Compton, Canada; sire 11th Duke of Thorndale 5611; dam Louan 44th, by Duke of Airdrie 2743; gr. d. Louan 24th, by Duke of Airdrie 2743..... 30

Second, Walcott & Campbell, New York Mills, N. Y., King of the Ocean; roan, calved July 6, 1869; bred by exhibitors; sire King Richard (26523); dam Fair Maid of Hope, by General Hopewell (17953); gr. d. British Maid, by British Prince (14197)..... 20

Third, Harry L. Chapman, Malone, N. Y., Laura 7th's Marmion; roan, calved May 13, 1869; bred by exhibitor; sire Santa Claus 7250; dam Laura 7th, by Marmion 1848; gr. d. Laura 3d, by Prince Leopold 869..... 10

First prize bull calf, George Butts, Manlius, N. Y, Sovereign; red, calved March 16, 1870; bred by exhibitor; sire Treble Gloster 7331; dam Spring Beauty, by Apricot's Gloster 2500; gr. d. Silkie, by the same bull 20

SHORT HORNS—COWS.

First prize cow, over three years old, Walcott & Campbell, New York Mills, N. Y., Fair Maid of Hope; white, calved February 4, 1865; bred by Richard Chaloner, Kingsfort, Ireland; sire General Hopewell (17953); dam British Maid, by British Prince (14197); gr. d. Village Rose, by Blood Royal (14169), 50

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Second, Walcott & Campbell, New York Mills, N. Y., Bride of the Vale; roan, calved January 6, 1865; bred by T. C. Booth, Warlaby, England; sire Lord of the Valley (14837); dam Soldier's Bride, by Windsor (14013); gr. d. Campfollower, by Crown Prince (10087)..... $30

Third, George Butts, Manlius, N. Y., Spring Beauty; red, calved April 6, 1864; bred by exhibitor; sire Apricot's Gloster 2500; dam Silkie, by Apricot's Gloster 2500; gr. d. Sally Randolph, by Lord Ducie 662 10

First prize heifer, two years old, Walcott & Campbell, New York Mills, N. Y., Rosamond 7th; red roan, calved May 26, 1868; bred by exhibitors; sire Weehawken 5260; dam Rosamond, by Quarrington (10671); gr. d. May Rose 3d, by Bellville (6778) 40

Second, George Butts, Manlius, N. Y., Strawberry; red, calved March 4, 1868; bred by exhibitor; sire Oscar 6016; dam Spring Beauty, by Apricot's Gloster 2500; gr. d. Silkie, by Apricot's Gloster 2500..... 25

Third, Walcott & Campbell, New York Mills, N. Y., Baron Oxford's Beauty; roan, calved March 11, 1868; bred by Colonel Townley, Lancashire, England; sire Baron Oxford (23375); dam British Beauty, by British Prince (14197); gr. d. Lady Abbess, by Cardinal (11246)..... 10

First prize heifer, one year old, Walcott & Campbell, New York Mills, N. Y., Minaret; roan, calved April 11, 1869; bred by T. C. Booth, Warlaby, England; sire King Richard (26523); dam Melissa, by General Hopewell (17953); gr. d. Melina, by Crown Prince (10087)..... 30

Second, Walcott & Campbell, New York Mills, N. Y., Mistress Ford; roan, calved December 15, 1868; bred by G. S. Foljambe, Osberton Hall, England; sire Lord Lyons (26677); dam Mistress Quickly, by Prince of Windsor (22638); gr. d. Queen of the May, by May Duke (16553)..... 20

Third, George Butts, Manlius, N. Y., Souvenir; red, calved May 3, 1869; bred by exhibitor; sire Treble Gloster 7331; dam Spring Beauty, by Apricot's Gloster 2500; gr. d. Silkie, by Apricot's Gloster 2500..... 10

First prize heifer calf, Walcott & Campbell, New York Mills, N. Y., 9th Maid of Oxford; red and white, calved December 6, 1869; bred by James O. Sheldon, Geneva, N. Y.; sire 10th Duke of Thorndale 5610; dam 3d Maid of Oxford, by Grand Duke of Oxford (16184); gr. d. Oxford 20th, by Marquis of Carrabas (11789)..... 20

Second, George Butts, Manlius, N. Y., Susan; red, calved March 9, 1870; bred by exhibitor; sire Treble Gloster 7331; dam Sarah, by Apricot's Gloster 2500; gr. d. Seraph, by Duke of Manlius 2773..... 10

The show of Short Horns, though not as large in numbers as some of our previous exhibitions, comprises as many really superior animals as we have had together for several years. Messrs. Walcott & Campbell have shown unparalleled spirit in collecting their herd, and deserve the thanks of the entire farming interest for the efforts they have made. All the animals they have exhibited are capital representatives of the breed. The show made by Mr. George Butts is one that does him much credit. The family characteristics are very strongly marked, and his animals show a quality and coat of hair which is rarely equalled.

THOMAS BELL, Eatontown, N. J.
SAMUEL THORNE, New York.

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No. 2. DEVONS—DEVON HERD PRIZE.

Walter Cole, Batavia, N. Y.....Large Gold Medal.

Bull, "Queen Anne's Huron;"

Calved 1863; bred by Edward G. Faile, West Farms, N. Y.; sire Huron (652); dam Queen Anne, by Tecumseh (535); gr. d. Jenny, by a son of Prince Albert (102).

Bull, "Helena's Huron 8th;"

Calved June 17, 1869; bred by exhibitor; sire Queen Anne's Huron, 320, A. H. B.; dam Helena 33d, by Comet (162); gr. d. Helena 20th, by Hiawatha (432).

Bull, "Helena's Huron 9th;"

Calved October 1, 1869; bred by exhibitor; sire Queen Anne's Huron, 320, A. H. B.; dam Helena 16th, by Omar Pasha (473); gr. d. Helena 3d, by May Boy (71).

Cow, "Helena 17th;"

Calved May 20, 1859; bred by C. S. Wainwright, Rhinebeck, N. Y.; sire Hiawatha (432); dam Helena 7th, by May Boy (71); gr. d. Helena 2d, by Megunticook (251).

Cow, "Lovely 18th;"

Calved 1862; bred by Ambrose Stevens, Batavia, N. Y.; sire Young Exeter (765); dam Lovely 3d, by Washington (130); gr. d. Lovely, by Megunticook (251).

Cow, "Helena 31st;"

Calved March 24, 1864; bred by C. S. Wainwright, Rhinebeck, N. Y.; sire Comet (162); dam Helena 17th, by Hiawatha (432); gr. d. Helena 7th, by May Boy (71).

Cow, "Helena 32d;"

Calved March 31, 1864; bred by C. S. Wainwright, Rhinebeck, N. Y.; sire Comet (162); dam Helena 7th, by May Boy (71); gr. d. Helena 2d, by Megunticook (251).

Heifer, "Helena 34th;"

Calved May 17, 1868; bred by C. S. Wainwright, Rhinebeck, N. Y.; sire Iroquois; dam Helena 33d, by Comet (162); gr. d. Helena 20th, by Hiawatha (432).

DEVONS—BULLS.

First prize bull, over three years old, J. M. Rockwell, Butternuts, N. Y., Otsego 2d; calved February 27, 1865; bred by Joseph Hilton, New Scotland, N. Y.; sire Sachem (554) H.*; dam Adaline, by Empire (424) H.; gr. d. Edith, imp $30

Second, C. T. Chamberlain, Cuba, N. Y., Prince; calved March 20, 1867; bred by William Simpson, Jr., New Hudson, N. Y.; sire Westchester, 370a; dam Alice, by Don Carlos (346); gr. d. Pawnee, by Exeter (198)..... 20

First prize bull, two years old, Truman Baker, Earlville, N. Y., Mohawk; calved April 15, 1838; bred by exhibitor; sire Frank Baker, 38; dam Lady Hilton, by Sachem (554) H.; gr. d. Alida, by Empire (424) H..... 30

First prize bull, one year old, Joseph Hilton, New Scotland, N. Y., Prince of Wales 5th; calved September 25, 1869; bred by exhibitor; sire Prince of Wales; dam Belle, by Albert (2); gr. d. Fanny, by Bloomfield (148)..... 25

* H., after number, refers to Howard's Herd Book.

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Second, Joseph Hilton, New Scotland, N. Y., Prince of Orleans; calved September 21, 1869; bred by exhibitor; sire Prince of Wales 2d; dam Nonpareil 4th, by Sachem (554) H.; gr. d. Empire's Nonpareil, by Empire (424) H..... $15

Third, Walter Cole, Batavia, N. Y., Helena's Huron 8th; calved June 17, 1869; bred by exhibitor; sire Queen Anne's Huron, 320; dam Helena 33d, by Comet (162); gr. d. Helena 20th, by Hiawatha (432)..... 10

First prize bull calf, Joseph Hilton, New Scotland, N. Y., Prince of Wales 6th; calved November 25, 1869; bred by exhibitor; sire Prince of Wales; dam Nonpareil 2d, by Sachem (554) H.; gr. d. Empire's Nonpareil, by Empire (424) H..... 20

Second, Truman Baker, Earlville, N. Y., Billy; calved March 20, 1870; bred by exhibitor; sire Mohawk; dam Lily, by Huron 2d (653); gr. d. Extra, by Bishop, 11..... 10

DEVONS—COWS.

First prize cow, over three years old, Walter Cole, Batavia, N. Y., Helena 31st; calved March 24, 1864; bred by C. S. Wainwright, Rhinebeck, N. Y.; sire Comet (162); dam Helena 17th, by Hiawatha (432); gr. d. Helena 7th, by May Boy (71)..... 30

Second, Walter Cole, Batavia, N. Y., Helena 32d; calved March 31, 1864; bred by C. S. Wainwright, Rhinebeck, N. Y.; sire Comet (162); dam Helena 7th, by May Boy (71); gr. d. Helena 2d, by Megunticook (251)..... 20

Third, J. M. Rockwell, Butternuts, N. Y., Red Rose; calved February 20, 1865; bred by Joseph Hilton, New Scotland, N. Y.; sire Sachem (554) H.; dam Primrose, by Empire (424) H.; gr. d. Moss Rose, by Duke of York (37), 10

First prize heifer, two years old, Walter Cole, Batavia, N. Y., Helena 34th; calved May 17, 1868; bred by C. S. Wainwright, Rhinebeck, N. Y,; sire Iroquois; dam Helena 33d, by Comet (162); gr. d. Helena 20th, by Hiawatha (432)..... 30

Second, Joseph Hilton, New Scotland, N. Y., Edith 3d; calved November 2, 1867; bred by exhibitor; sire Sachem (554) H.; dam Edith, by Barton; gr. d. Emily, by Spencer..... 20

Third, Joseph Hilton, New Scotland, N. Y., Nonpareil 6th; calved January 15, 1868; bred by exhibitor; sire Napoleon, dam Empire's Nonpareil, by Empire (424) H.; gr. d. Nonpareil, by Prince Albert (102)..... 10

First prize heifer, 1 year old, Joseph Hilton, New Scotland, N. Y., Belle 4th; calved April 10, 1869, bred by exhibitor; sire Prince of Wales, dam Belle 2d, by Sachem (554) H.; gr. d. Belle, by Albert (2)..... 25

Second, W. E. Arnold, Otego, N. Y., Daisy 3d; calved May 28, 1869, bred by exhibitor; sire General Grant 2d, 227, dam Daisy, by Young Exeter (765); gr. d. Tiara 2d, by Washington (130)..... 15

First prize heifer calf, Joseph Hilton, New Scotland, N. Y., Edith 4th; calved February 3, 1870, bred by exhibitor; sire Prince of Wales, dam Edith 2d, by Sachem (554) H.; gr. dam Edith, by Barton..... 20

Second, Truman Baker, Earlville, N. Y., Bloom 2d; calved March 20, 1870, bred by exhibitor; sire Mohawk, dam Bloom, by Sir Walter Raleigh (560), H., gr. d. Fancy, by Baltimore (363) H..... 10

The Devon cattle exhibited at the late show of the New York State Agricultural Society, at Utica, possessed more general merit in the females than in the males. The competition in the latter was not strong. In bulls over three years old there

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were but five, and two of these, Mr. Hilton's and Mr. Cole's, were ineligible from having already received first prizes. These being withdrawn, the remaining three were not up to what should be regarded as the standard for this breed. For two year old bulls there was but a single entry, that of Mr. Baker, of Earlville, N. Y., for which the first prize was awarded; although, in such a competition as would have been desirable, he might not have secured that honor. In yearling bulls there were only four entries, and the selection of the three entitled to the prizes was not difficult In bull calves there were eight competitors for the two prizes. It is much more difficult to decide at this green age as to the relative standing the animals may sustain at maturity, but several of the calves show points which indicate that they will ultimately excel most of those in the older classes.

Mr. Cole's Queen Anne's Huron, seven years old, and Mr. Hilton's imported Prince of Wales, six years old, competed for the Society's certificate. They are both fine bulls. Mr. Cole's has the advantage in general symmetry, but considering the superior size, substance and evident thriftiness of Mr. Hilton's, the judges felt bound to give him the preference. It is proper to state that the progeny of this bull, exhibited on the ground, indicated that he will prove a valuable cross for much of our Devon stock.

In cows over three years old there were fourteen entries, and the class was altogether a good one. The six cows of Mr. Cole would have taken high rank in any exhibition of Devons. They have size enough, and combined with that, vigorous constitutions, symmetry, great fattening tendency and fine quality of flesh. From this language in regard to Mr. Cole's cows, it should not be inferred that the fine ones belonging to Mr. Rockwell, Mr. Hilton, Mr. Baker and Mr. Arnold, are overlooked.

The class of two-year old heifers comprised some very promising animals. The three that took the prizes may be particularly mentioned, while one of Mr. Baker's approached one of Mr. Hilton's that took a prize, so closely that it was not easy to decide between them. Only two yearlings competed. In heifer calves there were four entries. Mr. Hilton's, which took the first prize, was a fine one, and the others, as a lot, fair.

For the "herd prize" there were but two competitors, Mr. Cole and Mr. Hilton. The herd of the former consisted of the bull Queen Anne's Huron, four of the cows before mentioned, and a two-year old heifer in milk. Mr. Hilton's herd comprised his imported bull, Prince of Wales, a five-year old cow (Belle 2d), and three heifers of his own breeding. The extraordinary merits of Mr. Cole's cows carried the award in his favor, although the herd of Mr. Hilton was decidedly good, and the animals bred by himself specially creditable to his skill.

The judges would mention what they regard as a remarkable example of the faculty of training cattle, presented to them by a boy named Byron Towner, fourteen years old, who had the management of Mr. Baker's calves. Mr. B. stated that it was only about ten days previous to the exhibition that any attempt had been made to train these animals; yet the boy could drive them four abreast, without their being fastened together, their movements being directed with great precision by words and motions of the driver. The judges would be pleased to see the praiseworthy efforts of the boy encouraged by a gratuity, if consistent with the views of the Executive Board.

Sanford Howard, Lansing, Mich.
George Short, 2d, Madrid, N. Y.

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No. 4. AYRSHIRES—AYRSHIRE HERD PRIZE.

Walcott & Campbell, New York Mills, N. Y.....Large Gold Medal.

Bull, "Lomond;"

Red and white, calved April 6, 1868, bred by exhibitors; sire Tarbolton, 372, dam Honeysuckle, by Rob Roy, 325, gr. d. Helen Douglas, imp.

Cow, "Cannie;"

Red and white, calved February 18, 1867, bred by exhibitors; sire Tarbolton, 372, dam Challenge 4th, by Robert Bruce, 314, gr. d. Challenge, imp.

Cow, "Jessie;"

Red and white; calved April 9, 1866; bred by exhibitors; sire Baldy 90; dam Bonnie Jean, by Dr. Hornbook 149; gr. d. Handsome Nell, imp.

Heifer, "Flossie;"

Brown and white; calved April 25, 1868; sire Tarbolton 372; dam Elspie, by John Gilpin 222; gr. d. imp. Ayrshire Lass.

Heifer, "Lily Dale;"

Brown and white, calved April 23, 1868; bred by exhibitors; sire Tarbolton 372; dam White Lily, imp.

Heifer, "Dainty;"

Brown and white, calved February 19, 1869; bred by exhibitors; sire Tarbolton 372; dam Lizzie, by Tam Glen 366; gr. d. Heather Bell, by Kilburn 229.

Heifer, "Harebell;"

Red and white, calved March 11, 1869; bred by exhibitors; sire Tarbolton 372; dam Helen Mar, by Baldy 90; gr. d. Helen Douglas, imported.

Heifer, "Pink;"

Red and white, calved March 18, 1870, bred by exhibitors; sire Kyle 234; dam Primrose, by Baldy 90; gr. d. Heather Bell, by Kilburn 229.

Heifer, "Charmer;"

Red and white, calved May 6, 1870; bred by exhibitors; sire Bruce; dam Charm, by Baldy 90; gr. d. Daisy, by Billy.

AYRSHIRES—BULLS.

First prize bull, over 3 years old, Walcott & Campbell, New York Mills, N. Y., Ivanhoe, brown and white; calved May 10, 1867; bred by exhibitors; sire Tarbolton 372; dam Tibbie, imp..... $30

Second, Robert Brodie, Smithville, N. Y., Robert Bruce; red and white, calved April, 1866; bred by James Brodie, Rural Hill, N. Y; sire General Grant; 176; dam Red Rose 2d, by Rob Roy 325; gr. d. Bonnie Jean, imp..... 20

First prize bull, 2 years old, Andrew Tuck, Flackville, N. Y., Lanark; dark red and white, calved March 18, 1868; bred by J. P. & T. A. Dawes, Lachine, Canada; sire Hero 613; dam Queen, by Eclipse 539; gr. d. Duchess, imp... 30

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Second, Walcott & Campbell, New York Mills, N. Y., Lomond; red and white, calved April 6, 1868; bred by exhibitors; sire, Tarbolton 372; dam Honeysuckle, by Rob Roy 325; gr. d. Helen Douglas, imp..... $20

Third, James M. Felt, Smithville, N. Y., Roscoe; red and white, calved April 11, 1868; bred by James F. Converse, Woodville, N. Y.; sire John Gilpin 222; dam Bright Eyes, by John Gilpin 222; gr. d. Flirt by Patchen 290½... 10

First prize bull, 1 year old, Walcott & Campbell, New York Mills, N. Y., Norval; red and white, calved July 2, 1869; bred by exhibitors; sire Ivanhoe 205; dam Nannie, by Rob Roy 325; gr. d. Handsome Nell, imp 25

Second, Robert Brodie, Smithville, N. Y., Albert; red and white, calved April, 1869; bred by J. F. Converse, Woodville, N. Y.; sire General Grant 176; dam Flirt, by Patchen 290½; gr. d. Lady Gowan 2d, by Heather Jock 193.. 15

Third, John Stryker, Rome, N. Y., Treasurer; red and white; calved September 23, 1869, bred by Walcott & Campbell, New York Mills, N. Y.; sire Tarbolton 372; dam Treasure, by Baldy 90; gr. d. Highland Mary, by Kilburn 229..... 10

First prize bull calf, Walcott & Campbell, New York Mills, N. Y., Fitz James; calved June 10, 1870; bred by exhibitors; sire Tarbolton 372; dam Jessie, by Baldy 90; gr. d. Bonnie Jean, by Doctor Hornbook 149..... 20

Second, E. C. Holden, McGrawville, N. Y., Bonnie Scotland; white and red, calved March 13, 1870; bred by exhibitor; sire Governor 7th; dam Jenny Lind 5th, by Governor 4th; gr. d. Lady Ayr 2d, by Governor 3d..... 10

Ayrshires—Cows.

First prize cow, over 3 years old, Walcott & Campbell, New York Mills, N. Y., Lady Clyde; white and brown; calved 1865, bred by John Meikle, Seafield, Bathgate, Scotland, and imported by exhibitors in July, 1870..... 30

Second, Walcott & Campbell, New York Mills, N. Y., Cannie; red and white, calved February 18, 1867; bred by exhibitors; sire Tarbolton 372; dam Challenge 4th, by Robert Bruce 314; gr. d. Challenge, imp..... 20

Third, Walcott & Campbell, New York Mills, N. Y., Jessie; red and white; calved April 9, 1866; bred by exhibitors; sire Baldy 90; dam Bonnie Jean, by Dr. Hornbook 149; gr. d. Handsome Nell, imp..... 10

First prize heifer, 2 years old, Walcott & Campbell, New York Mills, N. Y., Flossie; brown and white; calved April 25, 1868; sire Tarbolton 372; dam Elspie, by John Gilpin 222; gr. d imp. Ayrshire Lass..... 30

First prize heifer, 1 year old, Walcott & Campbell, New York Mills, N. Y., Harebell; red and white, calved March 11, 1869; bred by exhibitors; sire Tarbolton 372; dam Helen Mar, by Baldy 90; gr. d. Helen Douglas, imp... 25

Second, Walcott & Campbell, New York Mills, N. Y., Dainty; brown and white, calved February 19, 1869; bred by exhibitors; sire Tarbolton 372; dam Lizzie, by Tam Glen 366; gr. d. Heather Bell, by Kilburn 229..... 15

Third, James Brodie & Son, Rural Hill, N. Y., White Lily; red and white, calved, April 20, 1869; bred by ———; sire John Gilpin 222; dam Clarentine, by Rob Roy 325; gr. d. Jennie 10

First prize heifer calf, Walcott & Campbell, New York Mills, N. Y., Pink; red and white, calved March 18, 1870; bred by exhibitors; sire Kyle 234; dam Primrose, by Baldy 90; gr. d. Heather Bell, by Kilburn 229..... 20

Second, Walcott & Campbell, New York Mills, N. Y., Charmer; red and white, calved May 6, 1870; bred by exhibitors; sire Bruce; dam Charm, by Baldy 90; gr. d. Daisy, by Billy..... 10

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The judges of Ayrshires, in making their report, remark that the Ayrshires were not in force as they have been at some previous fairs. Hence, in some of the classes there was not that competition which is desirable.

In awarding the herd prize to Messrs. Walcott & Campbell, the judges take pleasure in commending the spirit of these breeders, and the skill and judgment evinced in nearly all the animals they exhibit.

The judges have felt constrained to award two premiums only in some of the classes, in consequence of the inferior quality of some of the animals exhibited.

In yearling bulls, after the call had been made and the ribands assigned, it appeared that Mr. John Stryker's bull Treasurer (entry 101) had not been produced. The committee could give him only what was left, the third premium, but were agreed that if he had been brought before them at the proper time, he would have received the first prize.

C. T. HULBURD, Brasher Falls.
WILLIAM BIRNIE, Springfield, Mass.

No. 5. JERSEYS—JERSEY HERD PRIZE.

Thomas J. Hand, Sing Sing, N. Y..... ..... Large Gold Medal.

Bull "Lawrence;"

Orange-fawn and gray; calved August 16, 1867; bred by E. Gibaut, in Jersey; sire a prize bull of Mr. Le Boutillier, of St. John Parish, Jersey; dam Clementine.

Cow, "Topaz;"

Solid orange-fawn, full black points; calved September 29, 1861, bred by J. Howard McHenry, Maryland; sire Comus, imported; dam Pearl, imported in her dam.

Heifer, "Emblem;"

Gray; calved February, 1868; bred by E. Gibaut, St. Lawrence, Jersey; sire Clement.

Heifer, "Hazel;"

Fawn; calved March, 1868; bred by P. Gaudin, in Jersey; sire Clement.

Heifer. "Velvet;"

Orange-fawn; calved in spring of 1868; bred by W. Labey, in Jersey.

Heifer Calf, "Turquoise;"

Solid fawn; calved December 21, 1869; bred by exhibitor; sire Lawrence 61; dam Topaz, by Comus 54; gr. d. Pearl, imp.

Heifer Calf, "Witch Hazel;"

Fawn or gray; calved April 28, 1870; bred by exhibitor; sire Southampton 117; dam Hazel, imp.

Heifer Calf, "Zenith;"

Solid fawn or gray; calved May 2, 1870; bred by exhibitor; sire Southampton 117; dam Emblem, imp.

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Jerseys—Bulls.

First prize bull, over 3 years old, Thomas J. Hand, Sing Sing, N. Y., Lawrence; orange-fawn and gray; calved August 16, 1867; bred by E. Gibaut, in Jersey; sire a prize bull of Mr. Le Boutillier, of St. John Parish, Jersey; dam Clementine $30

Second, William B. Dinsmore, Staatsburgh, N. Y., Jerry; brown; calved February, 1864; bred in Jersey; imported by exhibitor in 1865 20

Third, George P. Nelson, Scarsdale, N. Y., Monadnuck; calved July 4, 1867; bred by James P. Swain, Bronxville, N. Y.; sire Bashan, imported by R. W. Cameron; dam Lady Webster, imp. by Mr. Spencer 10

First prize bull, 2 years old, J. Howard McHenry, Pikesville, Md., Southampton; fawn and gray; calved June, 1868; bred by P. Gaudin, St. Martins, Jersey 30

First prize bull, 1 year old, John Shattuck, Norwich, N. Y., Bummer; brown; calved May 6, 1869; bred by William B. Dinsmore, Staatsburgh, N. Y.; sire Jerry, imp.; dam Bettie 2d; gr. d. Bettie, imp. 25

Second, William B. Dinsmore, Staatsburgh N. Y., Emperor; gray; calved November, 1868; bred by exhibitor; sire Jerry, imp.; dam Eve 2d; gr. d. imp. Eve 15

First prize bull calf, William B. Dinsmore, Staatsburgh, N. Y., Baron; gray; calved April 2, 1870; bred by exhibitor; sire Napoleon, imp.; dam Gussie, imp. 20

Second, William B. Dinsmore, Staatsburgh, N. Y., General; gray; calved October, 1869; bred by exhibitor; sire Napoleon, imp.; dam Gracie, imp... 10

Jerseys—Cows.

First prize cow, over 3 years old, William B. Dinsmore, Staatsburgh, N. Y., Kitty; gray; calved August, 1866; imported by exhibitor in 1868 30

Second, Thomas J. Hand, Sing Sing, N. Y., Topaz; solid orange-fawn, full black points; calved September 29, 1861; bred by J. Howard McHenry Maryland; sire Comus, imported; dam Pearl, imported in her dam 20

Third, William B. Dinsmore, Staatsburg, N. Y., Rachel; gray; calved March, 1866; imported by exhibitor in 1868 10

First prize heifer, 2 years old, Thomas J. Hand, Sing Sing, N. Y., Emblem; gray; calved February, 1868; bred by E. Gibaut, St. Lawrence, Jersey; sire Clement 30

Second, William B. Dinsmore, Staatsburgh, N. Y., Victoria; light brown; calved May, 1868, imported by exhibitor in 1870 20

Third, William B. Dinsmore, Staatsburgh, N. Y., Chloe; brown; calved December 26, 1867; bred by exhibitor; sire Jerry, imp.; dam Clara 2d; gr. d. Clara, imp 10

First prize heifer, 1 year old, William B. Dinsmore, Staatsburgh, N. Y., Susie 2d; gray; calved April 1, 1869; bred by exhibitor; sire Jerry, imp.; dam Susie, imp. 25

First prize heifer calf, Thomas J. Hand, Sing Sing, N. Y., Zenith; solid fawn or gray; calved May 2, 1870; bred by exhibitor; sire Southampton 117; dam Emblem, imp 20

Second, William B. Dinsmore, Staatsburgh, N. Y., Susie 3d; gray; calved April 29, 1870; bred by exhibitor; sire Napoleon, imp.; dam Susie, imp... 10

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Highly Commended.

James P. Swain, Bronxville, N. Y., Guernsey heifer, Utica; calved March 10, 1868; bred by exhibitor from stock imported by himself and Messrs. Roswell Colt and Nicholas Biddle.

James P. Swain, Bronxville, N. Y., Guernsey heifer calf, Lily Maynard; calved March, 1870; sire Guernsey bull; dam sister to Utica.

The judges of Jerseys respectfully report that there was a very fine show in this class, both as to number and quality, competition being so close in some cases as to render it difficult to decide.

The bull "Southampton," imported in 1868 (when five months old) direct from the island of Jersey, and exhibited by J. Howard McHenry, of Maryland, is in our opinion as fine a specimen of the breed as has been show for many years.

A number of Guernseys were shown by James P. Swain, of Bronxville, including recent importations direct from the island. There being no premiums offered for this breed, they are of course shown only as extra stock; but we highly commend the heifer "Utica" and heifer calf "Lily Maynard," both bred by Mr. Swain.

BENJ. L. SWAN, JR., Oyster Bay.
JOHN D. WING, Washington.

No. 6. MILCH COWS, ETC.

Milch Cows.

Second prize, Robert Bell, West Brighton, N. Y. $20

Grade Short Horn Cows and Heifers.

First prize, Robert Bell, West Brighton, N. Y., Lily May; red and white; calved June 2, 1868; bred by exhibitor; sire Major Jack Downing (short horn); dam Kate (grade short horn) 20

Grade Ayrshire Cows or Heifers.

Second prize, E. C. Holden, McGrawville, N. Y. 15

No. 7. OXEN, STEERS AND FAT CATTLE.

Working oxen over five years old.

First prize, Truman Baker, Earlville, N. Y. 20
Second, Joseph Hilton, New Scotland, N. Y. 15
Third, Taylor Hasselkuse, North Litchfield, N. Y. 10

Working oxen, four years old.

First prize, Truman Baker, Earlville, N. Y. 20
Second, James L. Blackstone, Kirkland, N. Y. 15

Steers, two years old.

First prize, Truman Baker, Earlville, N. Y. 20

Fat oxen, over four years old.

First prize, Benjamin Fellows, Clifton, N. Y. 20
Second, Benjamin Fellows, Clifton, N. Y. 15
Third, Benjamin Fellows, Clifton, N. Y. 10

Your committee, residing in the counties of Chenango and Otsego, accustomed to see daily full herds of choice milking cows, felt highly honored by the compliment

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of being appointed judges in this class, thus having an opportunity of seeing the renowned cows of Oneida and Herkimer counties.

Calling for milch cows of this class, we could hardly express our disappointment at seeing *one lone* cow offered, and she not in milk. After mature deliberation, and being satisfied that a few months at farthest would bring her in full milk, we concluded to award her the *second* prize.

In grade cows the display was very light. With the liberal premiums offered for these classes, it does seem wrong that the farmers, who know that the grades of the different breeds are the stock which command their highest attention, will not fill the yards; and we would take the liberty to urge upon the farmers, in future, a full show of *grade* and *dairy* cows.

In Class I, No. 7, your committee found competition very close, and the many pairs of fine working oxen, so different in styles and character, made the decision a very difficult matter; but deciding that those carrying only enough flesh for the practical purposes of the farm and the road, should strictly class as working cattle, we give the beautiful twin Devon oxen (Herd Book animals) of Truman Baker the *highest premium.*

The two pairs of heavy oxen shown by Taylor Hasselkuse were, under the above ruling, debarred from a full, fair competition. These pairs deserve more than a passing notice. Aged, respectively, six and seven years, and weighing, the one pair 4,400 pounds, and the other 5,000, they still moved as sprightly and quick as many a pair carrying less weights.

Your committee, however, would recommend that cattle of these weights should be classed with fat cattle, showing plainly, as they do, the effects of high feeding more than hard labor.

The class of fat oxen was most capitally represented by the five head of Benjamin Fellows, of Monroe (one for exhibition only), and the steers of Messrs. Morgan Butler and Richard Williams of Oneida.

The first and second premiums were awarded to Mr. Fellows, on the twin white oxen (Herd Book animals, dam Flora Temple, by "Premier." Flora Temple was out of "Ruby 2d," a pure Short horn of Chapman's breeding).

The fine steer of Morgan Butler, fattened almost exclusively on hay and grass, was a splendid animal.

JOHN BANKS, Bainbridge.
WM. E. ARNOLD, Otego.

CLASS II—HORSES.

No. 8. BREEDING AND GROWING STOCK.

Special premium (offered by a member of the Society) for the best stallion for general purposes, over six years old, not less than fifteen hands three inches high, that has been kept for mares the past season, and has served not fewer than fifteen; open to all stallions in the United States and Canada, except the winner of the similar prize at last year's fair.

Alden Goldsmith, Blooming Grove, N. Y., Woburn; brown, 16, 7 years; by Rysdyk's Hambletonian, dam by Telegraph (he by Cassius M. Clay, dam by Abdallah, gr. d. by American Eclipse); gr. d. by Friday (he by Trustee) $200

Stallions for general purposes, each to be accompanied by not less than six of his produce, one year old or over; the merits of both sire and produce to be considered.

First prize, Edwin Thorne, Thorndale, Washington Hollow, N. Y., Hamlet; bay, 15.2¼, 11 years; by Volunteer; dam by Hulse's Hickory .....Gold Medal.

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Second, Harrison Bacon, Watertown, N. Y., Ethan Allen; bay, 15.3, 14 years; by old Ethan Allen, dam of Messenger and Highlander stock..... $40
Third, Samuel J. Look, Clayville, N. Y., Young Otsego; white, 16.1, 15 years; by old Otsego (he by Cassius M. Clay, dam by Abdallah); dam by the Morse horse Norman, gr. d. by Mount Holly..... 20

Draught stallions, four years old or over.

First prize, Levi Kinney, Waterloo, N. Y.; black, 16.2, 8 years 30
Second, George Gray, Bowmanville, Canada, Sir William Wallace; gray, 17.2, 8 years 20
Third, Metcalf & Dering, Utica, N. Y., Sir William Wallace; brown, 16.2, 7 years (of Clyde breed, imported from Canada)..... 10

Stallions for getting roadsters.

First prize, Alden Goldsmith, Blooming Grove, N. Y., Woburn; brown, 16, 7 years; by Rysdyk's Hambletonian; dam by Telegraph; gr. d. by Friday.. 30
Second, Edwin Thorne, Thorndale, Washington Hollow, N. Y., Thorndale; bay, 15.1, 5 years; by Alexander's Hambletonian; dam by Mambrino Chief; gr. d. by a son of Potomac; g. gr. d. by Saxe Weimar..... 20
Third, Lewis G. Morris, Mount Fordham, Fordham, N. Y., Orion; gray, 15.2, 4 years; by Rysdyk's Hambletonian; dam May, by True Messenger; gr. d. by Revenge..... 10

Three year old stallions.

First prize, Lewis G. Morris, Mount Fordham, Fordham, N. Y., Arcturus; bay, 16; by Rysdyk's Hambletonian; dam June, by True Messenger; gr. d. by Revenge..... 30
Second, Edwin Thorne, Thorndale, Washington Hollow, N. Y., Rifleman; bay, 15; by Hamlet; dam by Saltram..... 20
Third, Leach & Hamilton, Westmoreland, N. Y., Starlight; bay, 15.1; by Middletown..... 10

Two year old stallions.

First prize, Lewis G. Morris, Mount Fordham, Fordham, N. Y., Marius; bay, 15.2; by The Marshal; dam Belle, by Monarch; gr. d. Lady Spang, by Gazan 20
Second, Lewis G. Morris, Mount Fordham, Fordham, N. Y., Marvel; bay, 15; by The Marshal; dam Lady Spang, by Gazan; gr. d. by Bertrand..... 10
Third, William Cooper, Whitestown, N. Y., ——; bay, 15; by F. T. Henderson's Pathfinder; dam by H. L. Barker's Norman..... 5

Yearling stallions.

First prize, Lewis G. Morris, Mount Fordham, Fordham, N. Y., Nonpareil; bay; by The Marshal; dam Narcissa, by Trustee; gr. d. by Emilius..... 20
Second, E. A. Newbury, Johnson's Creek, N. Y.; chestnut, 15 10
Third, Holmes Rider, Grafenberg, N. Y.; gray..... 5

Brood mares with foals at foot.

First prize, George Hamill, Rome, N. Y.; bay, 15.3, 5 years; by George Benedict's Pathfinder; foal at foot, by Wallkill Chief..... 30
Second, Samuel J. Look, Clayville, N. Y.; chestnut, 15.1, 4 years 20
Third, T. T. Cavanagh, Watertown, N. Y.; bay, 15.1, 5 years..... 10

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Three year old fillies.

First prize, Edwin Thorne, Thorndale, Washington Hollow, N. Y., Constance; bay, 15; by Hamlet; dam by Long Island Black Hawk..... $30
Second, J. A. D. Snell, Adams Centre, N. Y.; bay, 15.2..... 20
Third, David Pugh, Utica, N. Y.; bay, 17..... 10

Two year old fillies.

First prize, Edwin Thorne, Thorndale, Washington Hollow, N. Y., Witch; bay, 14.2; by Hamlet; dam by Flying Cloud; gr. d. by Mambrino Paymaster, 20
Second, Lewis G. Morris, Mount Fordham, Fordham, N. Y., Myrtle; bay; by The Marshal; dam Rebecca, by Glencoe; gr. d. by Medoc..... 10
Third, R. A. Jones, Whitesboro, N. Y..... 5

Yearling fillies.

First prize, Lewis G. Morris, Mount Fordham, Fordham, N. Y., Juniata; bay; by Prizefighter; dam June, by True Messenger; gr. d. by Revenge 20
Second, I. S. Foster, New Hartford, N. Y.; bay, 14..... 10
Third, Leach & Hamilton, Westmoreland, N. Y., ——; by Independence; dam by old Pathfinder 5

S. R. BOWNE, Rhinebeck.
C. C. BRADLEY, JR., Syracuse.
JOHN A. KING, Great Neck.

No. 8. HARNESS AND SADDLE HORSES.

Carriage horses sixteen hands or over.

First prize, Joseph L. Treat, Auburn, N. Y.; bay, 16, 5 years..... 20
Second, George I. Wheeler, Rome, N. Y.; bay, 16.1, 6 years..... 10
Third, H. Karriger, Perry N. Y.; bay geldings, 16.2, 7 years..... 5

Carriage horses over fifteen and under sixteen hands high.

First prize, E. Z. Wright, Utica, N. Y.; bay, 15.3½, 7 years..... 20
Second, C. Fonda, Saratoga Springs, N. Y..... 10
T. P. Williams, Sidney, N. Y.; black mares, 15.1, 6 years; a very fine pair, but under size ..... Commended.

Pairs draught or farm horses.

First prize, The Cayuga Chief Manufacturing Company, Auburn, N. Y.; chesnuts, 8 years..... 20

Single harness horses.

First prize, Lewis G. Morris, Mount Fordham, Fordham, N. Y., Vivandiere; bay mare, 15.2, 4 years; by Volunteer; dam by Abdallah..... 10
Second, G. A. Hosington, Adams, N. Y.; bay gelding, 8 years old 8
Third, Luke Coan, Westmoreland, N. Y.; bay gelding, 16, 4 years old..... 4

Saddle Horses.

First prize, William Boyd, Medina, N. Y.; bay Morgan mare, 15.2, 4 years .. 10
Second, John P. Levy, Ridgeway, N. Y; black gelding, 16, 5 years..... 8
Third, James M. Matthews, Utica, N. Y.; dark bay gelding, 15½, 8 years..... 4

ALDEN GOLDSMITH, Blooming Grove.
C. C. BRADLEY, JR., Syracuse.

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CLASS III.—SHEEP, SWINE AND POULTRY.

No. 11. FAT SHEEP (LONG-WOOLED) OVER TWO YEARS OLD.

Second prize, Robert Bell, West Brighton, N. Y. $3

Grade or cross-bred ewe lambs, bred chiefly for mutton.

First prize, N. Barns, New Hartford, N. Y..... 5

No. 12. LONG-WOOLED SHEEP.

Leicester rams under two years.

First prize Jurian Winne, Bethlehem Centre, N. Y.; bred by exhibitor..... 15
Second, Jurian Winne, Bethlehem Centre, N. Y.; bred by exhibitor 10
Third, Jurian Winne, Bethlehem Centre, N. Y.; bred by exhibitor..... 5

Leicester rams over two years.

First prize, Jurian Winne, Bethlehem Centre, N. Y.; 3 years; bred by exhibitor 15
Second, Jurian Winne, Bethlehem Centre, N. Y.; 2 years; bred by Walcott & Campbell, New York Mills, N. Y..... 10
Third, Jurian Winne, Bethlehem Centre, N. Y.; 2 years; bred by exhibitor.. 5

Pens of (3) *Leicester ram lambs.*

First prize, Jurian Winne, Bethlehem Centre, N. Y..... 10

Pens of (3) *Leicester ewes over two years.*

First prize, Walcott & Campbell, New York Mills, N. Y.; bred by exhibitors, 15
Second, Jurian Winne, Bethlehem, Centre, N. Y.; bred by exhibitor 10

Pairs of (3) *Leicester ewes under two years.*

First prize, Jurian Winne, Bethlehem Centre, N. Y.; bred by A. Gesner, Canada West 15
Second Jurian Winne, Bethlehem Centre, N. Y.; bred by exhibitor 10
Third, Walcott & Campbell, New York Mills, N. Y.; bred by exhibitors..... 5

Cotswold rams over two years.

First prize, Burdett Loomis, Windsor Locks, Conn.; 3 years, bred by Robert Garne, England..... 15
Second, Burdett Loomis, Winser Locks, Conn.; 2 years, bred by Robert Garne, England..... 10
Third, Chase & Harris, Rochester, N. Y..... 5

Cotswold rams under two years.

First prize, Chase & Harris, Rochester, N. Y..... 15
Second, Burdett Loomis, Windsor Locks, Conn.; bred by exhibitor..... 10
Third, Chase & Harris, Rochester, N. Y..... 5

Pens of (3) *Cotswold ram lambs.*

First prize, Jacob Albright, Etna, N. Y..... 10
Second, Chase & Harris, Rochester, N. Y..... 5

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Pens of (3) *Cotswold ewes over two years.*

First prize, Burdett Loomis, Windsor Locks, Conn.; 2 years; bred by Robert Garne, England $15
Second, Jacob Albright, Etna, N. Y.; bred by Robert Garne, Gloucester, England 10
Third, Chase & Harris, Rochester, N. Y 5

Pens of (3) *Cotswold ewes under two years.*

First prize, Burdett Loomis, Winsor Locks, Conn.; bred by exhibitor 15
Second, Chase & Harris, Rochester, N. Y..... 10
Third, Chase & Harris, Rochester, N. Y. 5

Pens of (3) *Cotswold ewe lambs.*

First Prize, Chase & Harris, Rochester, N. Y..... 10
Second, Chase & Harris, Rochester, N. Y. 5

Lincoln Rams over two years.

First prize, Walcott & Campbell, New York Mills, N. Y.; 2 years; bred by T. Battersby England 15

Lincoln rams under two years.

First prize, Walcott & Campbell, New York Mills, N. Y.; bred by W. Marshall, England 15

Pens of (3) *Lincoln ewes over two years.*

First prize, Walcott & Campbell, New York Mills, N. Y.; 4 years; bred by W. Marshall, England, and by exhibitors 15

Pens of (3) *Lincoln ewes under two years.*

First prize, Walcott & Campbell, New York Mills, N. Y.; bred by exhibitors, 15

No. 13. MIDDLE-WOOLED SHEEP.

Southdown rams over two years.

First prize, George H. Brown, Millbrook, N. Y., 2 years 15
Second, John Lynch, West Brighton, N. Y..... 10
Third, George H. Brown, Millbrook, N. Y.; 2 years..... 5

Southdown rams under two years.

Second prize, John Lynch, West Brighton, N. Y..... 10

Pens of (3) *Southdown ram lambs.*

Second prize, John Lynch, West Brighton, N. Y..... 5

Pens of (3) *Southdown ewes over two years.*

First prize, John Lynch, West Brighton, N. Y..... 15
Second, George H. Brown, Millbrook, N. Y.... 10
Third, George H. Brown, Millbrook, N. Y..... 5

Pens of (3) *Southdown ewes under two years.*

First prize, John Lynch, West Brighton, N. Y..... 15

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Pens of (3) *Southdown ewe lambs.*

First prize, John Lynch, West Brighton, N. Y..... $10

B. A. SWEET, Albany.
H. CLAY. HOLMES, Coville.

No. 14. MERINOS.

Merino rams over two years.

First prize, Wm. Chamberlain, Red Hook, N. Y..... 20
Second, Wm. Chamberlain, Red Hook, N. Y..... 10
Third, Carl Heyne, Red Hook, N. Y..... 5

Merino rams under two years.

First prize, Wm. Chamberlain, Red Hook, N. Y..... 20
Second, Wm. Chamberlain, Red Hook, N. Y..... 10
Third, Carl Heyne, Red Hook, N. Y..... 5

Pens of (3) *merino ram lambs.*

First prize, Wm. Chamberlain, Red Hook, N. Y..... 10
Second, Peter and George F. Martin, East Rush, N. Y..... 5

Pens of (3) *merino ewes over two years.*

First prize, Wm. Chamberlain, Red Hook, N. Y..... 20
Second, Wm. Chamberlain, Red Hook, N. Y..... 10
Third, Carl Heyne, Red Hook, N. Y..... 5

Pens of (3) *merino ewes under two years.*

First prize, Wm. Chamberlain, Red Hook, N. Y..... 20
Second, Wm. Chamberlain, Red Hook, N. Y..... 10
Third, Carl Heyne, Red Hook, N. Y..... 5

Pens of (3) *merino ewe lambs.*

First prize, Wm. Chamberlain, Red Hook, N. Y..... 10
Second, Carl Heyne, Red Hook, N. Y..... 5

Pens of (3) *grade merino ewes over two years old.*

First prize, Wm. Chamberlain, Red Hook, N. Y..... 8

Pens of (3) *grade merino yearling ewes.*

First prize, Wm. Chamberlain, Red Hook, N. Y..... 8
Second, John P. and Wesley W. Ray, Honeoye, N. Y.; bred by W. W. Ray.. 4

Pens of (3) *grade merino ewe lambs.*

First prize, Wm. Chamberlain, Red Hook, N. Y..... 5

H. D. TELLKAMPF, New York.
ANTHONY HOFFMAN, Pine Plains.
WALTER COLE, Batavia.

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No. 15. Swine.

Boars, large breed, over two years.

First prize, Taber & Holmes, Cazenovia, N. Y., Poland and China; bred by A. C. Moore, Fulton county, Illinois	$15
Second, McLean & Mather, Henderson, N. Y., Cheshire	10
Third, T. T. Cavanagh, Watertown, N. Y	5

Boars, large breed, one year old.

First prize, A. L. Thomas, Cuba, N. Y., improved Cheshire	15
Second, James F. Converse, Woodville, N. Y	10
Third, N. Y. State Lunatic Asylum, Utica, N. Y., Cheshire and Yorkshire	5

Boar pigs, large breed, between six and twelve months.

First prize, A. L. Thomas, Cuba, N. Y., improved Cheshire	15
Second, Taber & Holmes, Cazenovia, N. Y., Poland and China	10
Third, S. P. Huffstater, Watertown, N. Y	5

Breeding sows, large breed, over two years.

First prize, James F. Converse, Woodville, N. Y	15
Second, N. Y. State Lunatic Asylum, Utica, N. Y., Yorkshire	10
Third, T. T. Cavanagh, Watertown, N. Y	5

Sows, large breed, one year old.

First prize, S. P. Huffstater, Watertown, N. Y	15
Second, McLean & Mather, Henderson, N. Y., Cheshire	10
Third, James F. Converse, Woodville, N. Y	5

Sow pigs, large breed, between six and twelve months.

First prize, A. L. Thomas, Cuba, N. Y., improved Cheshire	15
Second, James Brodie & Son, Rural Hill, N. Y	10
Third, McLean & Mather, Henderson, N. Y.; Cheshire	5

Pens of (5) *pigs, large breed, under six months.*

First prize, A. L. Thomas, Cuba, N. Y.; improved Cheshire	15
Second, S. P. Huffstater, Watertown, N. Y.	10
Third, S. P. Huffstater, Watertown, N. Y	5

Boars, small breed, two years old and and over.

First prize, Joseph Harris, Rochester, N. Y.; Essex	15

Boars, small breed, one year old.

First prize, Robert Bell, West Brighton, N. Y.	15

Boar pigs, small breed, between six and twelve months.

First prize, Joseph Harris, Rochester, N. Y.; Essex	15
Second, Joseph Harris, Rochester, N. Y.; Essex	10

Breeding sows, small breed, over two years.

First prize, Joseph Harris, Rochester, N. Y.; Essex	15

Sows, small breed, one year old.

First prize, Joseph Harris, Rochester, N. Y.; Essex	15
Second, Joseph Harris, Rochester, N. Y.; Essex	10

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Sow pigs, small breed, between six and twelve months.

First prize, Richard Gibson, New York Mills, N. Y.; Berkshire, imported.... $15
Second, Richard Gibson, New York Mills, N. Y.; Berkshire, imported 10
Third, Joseph Harris, Rochester, N. Y.; Essex 5

Pens of (5) pigs, small breed, under six months.

First prize, Joseph Harris, Rochester, N. Y.; Essex..... 15
Second, A. L. Thomas, Cuba, N. Y..... 10
Third, Joseph Harris, Rochester, N. Y.; Essex and Berkshire 5

RICHARD PECK, Lima.
SAMUEL BAYLESS, Binghamton.

No. 16. POULTRY.

Trios Gray Dorkings.

First prize, George H. Warner, New York Mills, N. Y..... 5
Second, J. Y. Bicknell & Co., Westmoreland, N. Y..... 3

Trios White Dorkings.

First prize, George H. Warner, New York Mills, N. Y. 5
Second, J. Y. Bicknell & Co., Westmoreland, N. Y..... 3

Trios Black-breasted Red Games.

First prize, J. Y. Bicknell & Co., Westmoreland, N. Y..... 5
Second, Joseph Patton, Utica, N. Y..... 3

Trios Gray Duck-winged Games.

First prize, J. Y. Bicknell & Co., Westmoreland, N. Y..... 5
Second, W. R. Dudley, Augusta, N. Y. 3

Trios other Gray Games.

Second prize, E. A. Wendell, Albany, N. Y..... 3

Trios Pile Games.

First prize, Warren Baker, West Schuyler, N. Y..... 5
Second, J. Y. Bicknell & Co., Westmoreland, N. Y..... 3

Trios Leghorns.

First prize, J. Y. Bicknell & Co., Westmoreland, N. Y..... 5
Second, J. Y. Bicknell & Co., Westmoreland, N. Y..... 3

Trios African Bantams.

First prize, J. Y. Bicknell & Co., Westmoreland, N. Y..... 5

Trios Gold-laced Bantams.

First prize, George H. Warner, New York Mills, N. Y. 5
Second, J. Y. Bicknell & Co., Westmoreland, N. Y..... 3

Trios Silver-laced Bantams.

First prize, George H. Warner, New York Mills, N. Y..... 5

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Trios Buff Cochins.

First prize, George H. Warner, New York Mills, N. Y.	$5
Second, Robert Ellis, Schenectady, N. Y.	3

Trios Partridge Cochins.

First prize, George H. Warner, New York Mills, N. Y.	5
Second, George H. Warner, New York Mills, N. Y.	3

Trios White Cochins.

First prize, J. Y. Bicknell & Co., Westmoreland, N. Y.	5

Trios Black Cochins.

Second prize, Robert Bell, West Brighton, N. Y.	3

Trios Light Brahmas.

First prize, J. Y. Bicknell & Co., Westmoreland, N. Y.	5
Second, George H. Warner, New York Mills, N. Y.	3

Trios Dark Brahmas.

First prize, George H. Warner, New York Mills, N. Y.	5
Second, Charles H. Townsend, Utica, N. Y.	3

Trios Hamburghs.

SILVER PENCILLED.

First prize, Robert Ellis, Schenectady, N. Y.	5
Second, Robert Bell, West Brighton, N. Y.	3

GOLD-SPANGLED.

First prize, J. Y. Bicknell & Co., Westmoreland, N. Y.	5
Second Charles Fink, Utica, N. Y.	3

GOLD-LACED.

First prize, J. Y. Bicknell & Co., Westmoreland, N. Y.	5

BLACK.

First prize, J. Y. Bicknell & Co., Westmoreland, N. Y.	5

Trios Houdans.

First prize, Geo. H. Warner, New York Mills, N. Y.	5
Second, Edward Warr, Utica, N. Y.	3

Trios Crève-Cœurs.

First prize C. H. & D. B. Walcott, New York Mills, N. Y.	5
Second, George H. Warner, New York Mills, N. Y.	3

Trios La Fleche.

First prize, Geo. H. Warner, New York Mills, N. Y.	5
Second, C. H. & D. B. Walcott, New York Mills, N. Y.	3

Pairs bronze turkeys.

First prize, R. A. Jones, Whitesboro, N. Y.	5
Second, N. Barns, New Hartford, N. Y.	3

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Pairs common black or brown turkeys.

Second prize, O. Howland, Auburn, N. Y. $3

Pairs white turkeys.

First prize, O. Howland, Auburn, N. Y. 5
Second, Thomas Gould, Aurora, N. Y. (white Holland) 3

Pairs Muscovy ducks.

First prize, J. Y. Bicknell & Co., Westmoreland, N. Y. 5
Second, N. Barns, New Hartford, N. Y. 3

Pairs Aylesbury ducks.

First prize, J. Y. Bicknell & Co., Westmoreland, N. Y. 5
Second, George H. Warner, New York Mills, N. Y. 3

Pairs Rouen ducks.

First prize, J. Y. Bicknell & Co., Westmoreland, N. Y. 5
Second, Thomas Gould, Aurora, N. Y. 3

Pairs Cayuga ducks.

First prize, J. Y., Bicknell & Co., Westmoreland, N. Y. 5
Second, J. Y. Bicknell & Co., Westmoreland, N. Y. 3

Pairs Bremen geese.

First prize, Robert Bell, West Brighton. N. Y. 5
Second, O. Howland, Auburn N. Y. 3

Pairs White China geese.

First prize, N. Barns, New Hartford, N. Y. 5

Pairs African geese.

First prize, E. A. Wendell, Albany, N. Y. 5
Second, N. Barns, New Hartford, N. Y. 3

Pairs wild geese.

First prize, J. Y. Bicknell & Co., Westmoreland, N. Y. 5
Second, O. Howland, Auburn, N. Y. 3

Pairs Guinea fowls.

First prize, J. Y. Bicknell & Co., Westmoreland, N. Y. 5
Second, N. Barns, New Hartford, N. Y. 3

Pairs pea fowls.

First prize, N. Barns, New Hartford, N. Y. 5

Pigeons.

First prize, J. Y. Bicknell & Co., Westmoreland, N. Y. 5
Second, N. Barns, New Hartford, N. Y. 3

Pairs common rabbits.

First prize, Stephen Treen, Utica, N. Y. 3
Second, Stephen Treen, Utica, N. Y. 2

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Pairs lop-eared rabbits.

First prize, Thomas Gould, Aurora, N. Y..... $5
Second, Thomas Gould, Aurora, N. Y..... 3

GEORGE TWEDDLE, Albany.
E. P. HOWLETT, Syracuse.

CLASS IV.—IMPLEMENTS AND MACHINERY.

The Wood & Mann Steam Engine Co., Utica, N. Y.; a thirty horse power stationery steam engine, with adjustable cut-off, and two fifteen horse power locomotive boilers; price of engine, $1,350; of boilers, $650 each.. Bronze Medal.

No. 17. IMPLEMENTS, FIRST LIST.

Improvements in mowers and reapers.

I. S. & H. R. Russell, New Market, Maryland; an improved castor wheel for reapers; 76 pounds, $7.50..... Certificate of Merit.

Stump machines.

C. A. Church, New Berlin, N. Y.; Pioneer Stump Puller; weight 300 pounds; $85..... Bronze Medal.

Tile machines.

J. W. Penfield, Cleveland, O.; Drain Tile Machine; 2,200 pounds, 4 feet by 3 feet; $400..... Bronze Medal.

Large threshing machines.

H. Birdsall, Son & Co., Penn Yan, N. Y.; Large Thresher (for steam power); 2,600 pounds; $465 .... Bronze Medal.

Wheeler, Melick & Co., Albany, N. Y.; Geiser Patent Thresher and Separator, mounted on truck, with straw stacker and grain register; 3,000 pounds; $465 ..... Certificate of Merit.

Small threshers with railway powers.

Martin Williams, St. Johnsville, N. Y.; Two-Horse Tread Power Thresher and Cleaner; Horse-Power 1,600 pounds, $150; Thresher 1,000 pounds, $200. .... Bronze Medal.

Wheeler, Melick & Co., Albany, N. Y.; Wheeler's Patent Two-Horse Railway Power Thresher and Cleaner; Horse-Power, 1,700 pounds, $185; Thresher, &c., 1,200 pounds, $235..... Certificate of Merit.

Lever power.

H. Birdsall, Son & Co., Penn Yan, N. Y.; Excelsior Triple Geared Iron (Lever) Horse power (10 Horse) 1,100 pounds; $165 ... . Certificate of Merit.

Harrows.

Gibson & Inglis, New York Mills, N. Y.; Flexible Harrow; 240 pounds, 6 feet 6 inches by 7 feet 9 inches; $30; used for all the purposes of ordinary harrows, also as a brush harrow on meadows and pastures, for collecting in heaps quackgrass, weeds, etc., on stubbles, and for pulling turnips.. Bronze Medal.

F. Nishwitz, Williamsburgh, N. Y.; Nishwitz's Pulverizing Harrow, two sizes, 5 feet square, 200 pounds, $30; and 6 feet by 6½, 230 pounds, $34...Bronze Medal.

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Grain drills

Bickford & Huffman, Macedon, N. Y.; The Farmers' Favorite Grain Drill, 554 pounds, width 6 feet 2 inches, $80 ..... Bronze Medal

Sowing machines for grain, seeds and manures.

Wilson & Murphy, East Bloomfield, N. Y.; Seymour's Plaster Sower, with Grass Seed Attachment, sows 8 feet 3 inches wide, 325 pounds, $60; grass seeder, extra, $10..... Bronze Medal

Osborne, Foster & Co., Palmyra, N. Y.; Two Horse Broadcast Sower, with harrow or cultivator attachment, for sowing all kinds of grain and covering at same time; also to sow plaster, lime, ashes, &c., 450 pounds, sows 7 feet, $75 ..... Bronze Medal.

Bristol & Robbins, Oswego, N. Y.; Machine for sowing grain, seeds and manures, 600 pounds, width 7 feet, $120 ..... Bronze Medal.

Horse-hoes for root crops.

F. L. Perry, Canandaigua, N. Y.; Scarifier or Cultivator, for corn, potatoes, root crops, &c.; 90 pounds; $20 ..... Bronze Medal.

Horse-hoes for grain crops, cultivators, etc.

P. S. Carhart, Collamer, N. Y.; Two-Horse Cultivator; 160 pounds; width 5 feet; $18..... Bronze Medal.

Potato diggers.

Brinkerhoff & Van Dusen, Auburn, N. Y.; Brinkerhoff's Hand Potato Digger; 8 pounds; $7..... Certificate of Merit.

George W. Kintz, Rochester, N. Y.; The "Free and Easy," a plough-form potato-digger; 170 pounds; $35 ..... Certificate of Merit.

Scrapers, &c.

C. C. Bradley & Son, Syracuse, N. Y.; Steel Dirt Scraper, (price not fixed.) Bronze Medal.

Swivel ploughs.

F. F. Holbrook & Co, Boston, Mass.; Holbrook's Swivel or Reversible Ploughs; No. 1, One-Horse Swivel Plough, with wheel, 73 pounds; $12. No. 2, Light Two Horse Swivel Plough, wheel and movable cutter, 124 pounds; $18. No. 4, Sod Two-Horse Swivel Plough, wheel and moveable cutter, 148 pounds; $20 ..... Bronze Medal.

Ford Brothers, Oneonta, N. Y.; Reversible Plough for flat land (patent applied for by E. C. Hodge), 125 pounds; $15..... Certificate of Merit.

Hay forks, &c.

George Smith, Syracuse, N. Y.; Carrier for unloading hay..... Bronze Medal.

E. U. & W. L. Scoville, Manlius, N. Y.; Rope Carrier and Stacker.. Bronze Medal.

The Pennock Manufacturing Company, Kennett Square, Penn.; Double Harpoon Horse Hay Fork; 20½ pounds; $10 ..... Bronze Medal

John H. Chapman, Clayville, N. Y.; Chapman's Railway Pitching Apparatus, for unloading hay, grain, straw, &c., into barns and sheds, consists of grapple fork, conveying car, post pulley and attaching grapples; 125 pounds; $40. Separately, the fork with pulleys and hooks; 55 pounds; $20. The car and fixtures, 50 pounds ..... Bronze Medal

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Miscellaneous.

A. D. Shaver, Belleville, N. Y.; A Sulky Riding Attachment for Harrows, connected to the harrow by a curved pole and swivel link, so as to hold the fore end of the harrow down, and causing it to run more evenly.. Bronze Medal.

The Albany Agricultural Works, Albany, N. Y.; The Universal Cotton Gin; 35 saws; 500 pounds; $173.25; and the Universal Condenser for Cotton Gin; 275 pounds; $102.38..... .... Bronze Medal.

John Valentine, Buffalo, N. Y.; Carter's Ditching Machine. The principal parts are an iron wheel, and a car upon which the driver stands and can regulate the depth. The wheel is 4 feet in diameter, 8 inches wide, with 5 inch flange on each edge; between the flanges are cogs 5 inches long, in pairs 12 inches apart. Behind and close to the wheel is a plough-shaped cutter, from which the wheel carries the dirt to the top and discharges it by a spout at the side; cuts 3 feet deep, 8 inches wide; worked by two men and three or four horses; 1,370 pounds; $175..... Bronze Medal.

J. J. Illingworth, Utica, N. Y.; Steam Tube Cleaner; $40..... Bronze Medal.

No. 18. Implements, Second List.

Fanning mills.

J. A. Krake, Alden, N. Y.; "New York Sifter" Fanning Mill, 200 pounds; $30..... ..... Certificate of Merit.

Separating, cleaning and assorting machines.

S. W. Paine, Troy, Penn.; H. B. Ingham, or California Wheat Cleaner, smutter and separator combined, for the use of flouring mills; No. 1, 1,100 pounds; $200. No. 2, 800 pounds; $150..... Bronze Medal.

Hinsdell, Drake & Way, Camillus, N. Y.; Grain Scourer and Separator, 400 pounds; 5 feet by 3 feet. Price not yet fixed. ..... Certificate of Merit.

Corn-husking machines.

L. Augustus Aspinwall, Hudson, N. Y.; Aspinwall's Patent Corn Husking Machine, patented April 12, 1870, to be driven by one or two horses, delivers husks underneath, stalks in front for binding, and corn in the rear of the machine; 525 pounds; $100..... Bronze Medal.

Jacob Russell, 16 Water street, Brooklyn, N. Y.; Russell's Improved Corn Husker, for husking corn as cut from the hill or picked from the stalk; No. 1, 800 pounds; $150.....Certificate of Merit.

Chaff cutters, hand and power.

George Parnell & Son, East Ontario, N. Y.; No. 2 Feed Cutter, for horse power; 325 pounds; $65.....Bronze Medal.

Reuben Daniels, Woodstock, Vt.; Daniels' Self-feeding Stalk and Hay Cutters, hand machine; 175 pounds; $25 .....Bronze Medal.

Corn shellers, hand and power.

Harmon W. Cornell, Owego, N. Y.; Double Corn Sheller, Separator and Cleaner, for hand or power; 150 pounds; 24 inches by 15 inches; $30. Bronze Medal.

Farm grain mills.

Munson Brothers, Utica, N. Y.; 24-inch Portable Grist Mill, E. Munson's patent, double geared, iron and wood; 1,968 pounds; $250.....Bronze Medal.

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Cider mills.

Warder, Mitchell & Co., Springfield, Ohio; Improved Buckeye Cider Mill, 2 sizes; $25 and $45 ....Bronze Medal.

Root cutters.

John R. Robertson, Syracuse. N. Y.; Robertson's Root Cutter; 100 pounds, 2 feet square; $14 .....Bronze Medal.

Pumps for farm use, and substitutes therefor.

Edward Backus, Rochester, N. Y.; Patric's Improved Cattle Pump; 200 pounds; $50 ....Certificate of Merit.

The Bridgeport Manufacturing Company, Bridgeport, Conn., by C. A. Bacon and H. D. Freyer, agents, Oneida, N. Y.; The American Submerged Pump, for farm use and for all other purposes of raising water by hand or power, and for throwing water through hose; so constructed as to be unaffected by frost; five sizes, capacities 20, 35, 70, 140 and 400 gallons per minute; prices, iron, $12, $20, $30, $50, $200; galvanized, $15, $25, $36, $65, $250. Certificate of Merit.

Washing machines.

Brinkerhoff & Van Dusen, Auburn, N. Y.; Continental Washing Machine; 65 pounds; 2 feet by 2 feet; $14.....Bronze Medal.

Samuel De Veau, Syracuse, N. Y.; Washing Machine, consisting of a common wash boiler with wheel inside and tight cover; $15 .....Certificate of Merit.

Clothes wringers.

John Young's Son, Amsterdam, N. Y.; The Monitor Clothes Wringer; three sizes; No. 1, $9; No. 2, $10; No. 3, $13.....Bronze Medal.

Planing machines, etc.

Frank & Co.. Buffalo, N. Y.; 20-inch and 24-inch Pony Planers; 16-inch Panel Planer; prices, 24-inch, $140; panel, 16-inch, $100.....Bronze Medal.

Davis & Gledhill, Albany, N. Y.; Davis' Double Slat Planer, for planing blinds, slats and sash; planing both sides with the grain; 900 pounds, 3½ feet by 2 feet; $300 .....Bronze Medal.

Davis & Gledhill, Albany, N. Y.; Moulding Machine for sticking door or any other mouldings; 800 pounds, 5 feet by 2½ feet; $250.....Bronze Medal.

Davis & Gledhill, Albany, N. Y.; Sand Paper Machine, for sand-papering doors, panels or any flat surfaces; 100 pounds, 5 feet by 5 feet; $45..Bronze Medal.

Daniel Doncaster, Albany, N. Y.; Planing and Matching Machine, for planing, tongueing and grooving boards and planks; 2,600 pounds, 8 feet by 4 feet; $700 .....Bronze Medal.

Daniel Doncaster, Albany. N. Y.; Double Sash and Blind Planer; 800 pounds, 4 feet by 3 feet; $350 .....Bronze Medal.

Daniel Doncaster, Albany, N. Y.; Vertical Resawing Mill, 3,000 pounds, 12 feet by 4 feet, $500. ..... Certificate of Merit.

Daniel Doncaster, Albany, N. Y.; Circular Re-sawing Mill, for clapboards and panels; 1,000 pounds, 4 feet by 3 feet; $400.....Certificate of Merit.

Read & Garton, North Brookfield, N. Y.; Read's Hand Planing Machine, for the use of cabinet makers, wagon builders, etc.; planes 7½ feet long and 5 inches thick, cutting with a disk; the machine travels over the timber; 300 pounds, 8½ feet by 20 inches; $70..... .....Certificate of Merit.

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Cheese presses.

Knight & Denison, Rome, N. Y.; Frazier patent Gang Cheese Press and hoops. Certificate of Merit.

Jacob Erdle, ——, ——; Screw and Lever Cheese Press.....Certificate of Merit.

Machines for sharpening knives of mowers and reapers.

Charles C. Hardy, Rutland, N. Y.; 140 pounds; $5.....Bronze Medal.

Hand seed drills.

F. F. Holbrook & Co., Boston, Mass.; Holbrook's Patent Regulator Hand Seed Drill; 38 pounds; $12.....Bronze Medal.

Lawn mowers.

Graham, Emlen & Passmore, Philadelphia, Pa.; The Philadelphia Lawn Mower, three sizes hand machines, No. 0, 10 in. cut, $15; No. 1, 15 in., $25; No. 2, 20 in., $35; and two sizes for horse-power, No. 2½, cut 30 in., $75; and No. 3, 36 in., $150.....Bronze Medal.

Chadborn & Coldwell Manufacturing Company, Newburgh, N. Y.; Hand Lawn Mower, for lawns and borders; 68 pounds; width 18 inches; $25... Certificate of Merit.

Miscellaneous.

William Dent, Utica, N. Y.; Screw-taps, Dies and Plates; the taps a new patented invention, also tap wrenches and reamers.....Bronze Medal.

McGannon, Granger & Co., Green Island, N. Y.; McClelland's Planing Machine Duster, for removing shavings and dust from wood-working machines; 600 pounds; $500.....Bronze Medal.

Moses Allen, Utica, N. Y.; Pair of Cast-iron Rachet, wrought-iron screws; 24 in.; 100 pounds; $50. Pair of Cider Mill Screws; 5 ft.; 100 pounds; $— Pair of Hoisting Screws; 5 ft.; 80 pounds; $28.....Certificate of Merit.

Moses Allen, Utica, N. Y.; Pair of 24 in. Wrought-iron Jacks; 200 pounds; $115. Pair of 36 in. Wrought-iron Jacks; 286 pounds; $145. Pair of 24 in. Wrought-iron Carrying Jacks; 280 pounds; $200.....Bronze Medal.

Jerome S. Mosely, Syracuse, N. Y.; Scroll Saw Machine, for all sorts of ornamental scroll work, requires about one-half horse-power in ordinary work; 300 pounds; $150.....Bronze Medal.

B. C. Davis, Binghamton, N. Y.; Davis' Machine for Wiring Blinds; $20..... Bronze Medal.

B. C. Davis, Binghamton, N. Y.; Davis' Machine for Cutting and Trimming Blind Rods; $10.....Certificate of Merit.

The American Horse Clipping Machine Company, Nashua, N. H.; The American Horse Clipping and Sheep Shearing Machine; 100 pounds; $100. Certificate of Merit.

Robert N. Short, Mechanicsburgh, Penn.; Fish's Patent Champion Tuyere for blacksmiths' use; $10 and $15.....Bronze Medal.

Sweet, Barnes & Co., Syracuse, N. Y.; Champion Upright Lever Drill, specially designed for manufacturers of mowing machines and other agricultural implements; 450 pounds; $125.....Certificate of Merit.

Emmons & Co., Oneonta, N.Y.; Wm. Mickle's Patent Machine for Cutting out and Chamferring Cask and Barrel Heads; two sizes; power machine; 350 pounds; $100. Hand Machine; 250 pounds; $75.....Bronze Medal.

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Bowers & Qualters, by John Irlam, agent, Ilion, N. Y.; Bowers & Qualter's patent Metallic Pistons..... Bronze Medal.

No. 19. TOOLS AND HAND IMPLEMENTS FOR THE FARM AND GARDEN.

Steel garden rakes.

First prize, Remington Agricultural Works, Ilion, N. Y..... $5

Hoes.

First prize, Remington Agricultural Works, Ilion, N. Y. 5
Second, H. C. Rogers, Sauquoit, N. Y.; H. C. Rogers' patent Self-sharpening Hoes; 75 cents 3

Files.

First prize, J. S. Irwin, Rochester, N. Y..... 5

Exhibition of farm and garden tools, etc.

First prize, Remington Agricultural Works, Ilion, N. Y..... 10

Draining tiles.

First prize, C. W. Boynton & Co., Woodbridge, N. J.; specimens of Round Land Draining Tiles and Collars ..... Bronze Medal.

Extra awards.

John Cantine & Co., Schenectady, N. Y; L. R. Wright's Patent Garden Cultivator; 28 pounds; $7..... Certificate of Merit.

George W. Kintz, Rochester, N. Y.; Rat Trap; $1 ..... Certificate of Merit.
Sweet, Barnes & Co., Syracuse, N. Y.; Case of Sample Mower Knives and Reaper Sickles..... Bronze Medal.
W. S. Staring, Frankfort, N. Y. ; Extension Ladders; lengths 18 to 30 feet; $4.50 to $7.50..... Bronze Medal.
F. Danforth, Auburn, N. Y.; contrivance for feeding fowls or sheep.. Bronze Medal.
Globe Nail Company, Bostoh, Mass.; samples of pointed, polished and finished Horse Shoe Nails..... Bronze Medal.
L. Dean, Utica, N. Y.; exhibition of ornamental iron work in cast iron, and for builders, comprising flower vases, fountains, settees, chairs, umbrella stands, wash stands, door pannels, window guards, steps, stable partitions and fittings, posts, window caps and sills, iron fence, etc..... Bronze Medal.
J. A. Lafler, Albion, N. Y.; specimens of bricks..... Bronze Medal.

No. 20. WAGONS, CARRIAGES, AND ARTICLES OF WHEELWRIGHTS' AND BLACKSMITHS' WORK.

Double covered carriages.

First prize, James Gould & Co., Albany, N. Y.; a "Bismarck Brett," on platform springs, with book or folding steps opening with the door, gold trimings, axles and tires of Bessemer steel; $1,150..... $10

Top buggys.

First prize, Isaac Knox, Rome, N. Y..... 10
Second C. G. Riggs & Son, Turin, N. Y. 5

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Open buggys.

First prize, C. G. Riggs & Son, Turin, N. Y. $10

Double sleighs.

First prize, James Gould & Co., Albany, N. Y.; Pony Sleigh, four seats, with pole; $350 10

Double farm wagons.

First prize, J. H. Wilson & Co., Whitesboro, N. Y.; Farm Wagon, with R. P. Gillett's patent brass-bearing Skeins, 3¼ by 11 inches., whiffletrees and neck-yoke; 680 pounds; $125..... 10

Extra entries.

John H, Chapman, Clayville, N. Y.; two pairs of Bob-sleighs; weights 500 and 475 pounds, each $60; entered for exhibition and also to show the difference between common and improved sleigh shoes..... Certificate of Merit

Assortments of wagon wood-work.

First prize, Darling, Brother & Co., Shortsville, N. Y..... $10
Second, William Selover & Co., Moravia, N. Y..... 5

Hay riggings.

First prize, Stephen J. Smith, Manchester, N. Y.; Hay-rack, used on any wagon-box sides, in two parts, made all of straight wood, and changeable to any pitch; 70 pounds, 14 feet by 7 feet; $5..... 5

Carriage harnesses.

First prize, W. H. Duval, Utica, N. Y.; set double Carriage Harness; $700... 5

Buggy harness.

First prize, W. H. Duval, Utica, N. Y.; set of Buggy Harness; $150 5

Men's saddles.

First prize, W. H. Duval, Utica, N. Y.; $50..... 5

Side saddles.

First prize, W. H. Duval, Utica, N. Y.; $75..... 5

Extra awards.

J. H. Fellows, Alba, Bradford Co., Penn.; Fellows' Patent Improved Automatic Seat-fastener, for carriages with moveable seats; patented July 26, 1870; fasteners 90 cents; socket irons 50 cents..... Certificate of Merit.
Hawley, McClure & Co., Utica, N. Y.; Pipe Skeins for wagons..... Bronze Medal.
Hawley, McClure & Co, Utica, N. Y.; Bolster Plates for wagons..... Certificate of Merit.
Hawley, McClure & Co., Utica, N. Y.; Stake Irons for wagons.. Certificate of Merit.
Hawley, McClure & Co., Utica, N. Y.; Iron Axles for wagons ..... Bronze Medal.
R. L. Fraser, Westernville, N. Y.; a new Snap Hook, of three sizes, for use in different parts of harness (not yet manufactured for sale, price not fixed).. Certificate of Merit.
W. H. Duval, Utica, N. Y.; for patent Traveling Trunks..... Bronze Medal.

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Benedict, Hamlin & Co., Albany, N. Y.; Benedict's patent Neckyoke and Pole Tip .....Certificate of Merit.

O. E. Mallory, Batavia, N. Y.; Mallory's Horizontal Extension and Shifting Rail for tops of buggys, etc.....Certificate of Merit.

SANFORD HOWARD, Lansing, Mich.
D. M. GREENE, Troy.
A. AVERY SWEET, Syracuse.
H. F. FRENCH, Concord, Mass.
JOSEPH HARRIS, Rochester.
DYER WILLIAMS, Syracuse.

No. 21. STOVES, ETC.

Cooking stoves for wood.

First prize, J. S. & M. Peckham, Utica, N. Y.; No. 9 "Popular" cooking stove, extension top, moveable hot water reservoir, and hot closet; 500 pounds; $60.....Bronze Medal.

Second, G. H. Phillips & Co., Troy, N. Y.; No. 9 "Reliable" cooking stove, with cast iron reservoir and closet; 270 pounds; $32 .....Certificate of Merit.

Cooking stoves for coal.

First prize, Swett, Quimby & Perry, Troy, N. Y.; No. 8 "New Empire" cooking stove, square top; 400 pounds; $37.....Bronze Medal.

Second, Backus & Co., Albany, N. Y.; No. 9 "Challenge" cooking stove, double acting flue, hot water tank in front hearth; 450 pounds; $53. Certificate of Merit.

Cooking stoves for wood or coal.

First prize, Perry & Co, Albany, N. Y.; No. 9 "American" cooking stove, with enamelled tank; 475 pounds; $59.....Bronze Medal.

Russel Wheeler, Utica, N. Y.; No. 9 "Nonpareil" air tight cooking stove, with patent hot blast, gas and smoke consuming, patent galvanized hot water reservoir, and tin hot closet; 525 pounds; $58 .....Certificate of Merit.

Sheldon, Greene & Co., Troy, N. Y.; No. 9 improved "Olive Branch" hot air cooking stove, with patent cast-iron galvanized reservoir and hot closet, wood and coal fixtures; 510 pounds; $54 .....Certificate of Merit.

Cooking ranges.

First prize, Swett, Quimby & Perry, Troy, N. Y.; the "Empire" cooking and heating range, designed for cooking, and heating upper rooms; the arrangement for contracting or enlarging the fire box for summer or winter use is peculiar to this range, and is patented; 700 pounds; $110....Bronze Medal.

Sheldon, Greene & Co., Troy N. Y.; No. 6 "Mammoth Olive Branch" hot air hotel cooking stove range, for wood and coal, with 40 gallon copper reservoir and tin warming closet; 1,120 pounds; $135.....Certificate of Merit.

Hot air furnaces.

First prize, Sheldon, Greene & Co., Troy, N. Y.; Henderson's new self-feeding gas burning furnace "Lively Times," No. 13, skeleton and brick front, $125; No. 12, $100; No. 14, $150; No. 15, $175; No. 16, $220 .....Bronze Medal.

Perry & Co., Albany, N. Y.; "Oriental" stationary hot air furnace, No. 24; 1,150 pounds; $175.....Certificate of Merit.

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Parlor stoves for wood.

First prize, J. S. & M. Peckham, Utica, N. Y.; No. 21 "Peace" base burner parlor stove, with register; $16.....Bronze Medal.

Parlor stoves for coal.

First prize, S. H. Ransom & Co., Albany, N. Y.; the "Light House" base burner parlor and office stove, with diving flue; No. 11, 211 pounds, $30; No. 12, 235 pounds, $33; No. 14, 288 pounds, $39; portable ovens attached, $5 extra.....Bronze Medal.

Buswell, Durant & Co., Troy, N. Y.; the "Ventilator" base-burning, self-feeding, return flue, parlor stove, four sizes; No. 10, 198 pounds, $27; No. 11, plain, 228 pounds, $32; with oven, 246 pounds, $40; No. 13, plain, 298 pounds, $40; with oven, 320 pounds, $45; No. 16, 350 pounds, $45. Certificate of Merit.

Hall stoves for coal.

First prize, S. H. Ransom & Co., Albany, N. Y.; the "Light House" base-burner stove, with direct draft or with diving flue, with or without second story heating attachment, and with or without portable oven; sizes, weights and prices as above.....Bronze Medal.

Buswell, Durant & Co., Troy, N. Y.; Parlor Heaters; No. 11, 325 pounds, $40; No. 13, 375 pounds, $50.....Certificate of Merit.

Dairy Apparatus.

William Ralph, Utica, N. Y.; The Oneida Cheese Vat.....Bronze Medal.

Charles Miller & Son, Utica, N. Y.; Miller's patent circulating coil heater and cheese vat.....Certificate of Merit.

R. D. Gardner, Watertown, N. Y.; Gardner's Milk Cooler; $20.....Bronze Medal.

A. P. Bussey, Westernville, N. Y.; A. P. Bussey's Milk Deodorizer and Cooler; size and form of strainer pail, applicable to all milk cans and vats; floats on the milk and cools by cold water or ice, deodorizing the milk while cooling; with or without syphon compartment and milk receiver and strainer. Receivers, $1.25; coolers, $5 and $7.....Certificate of Merit.

Charles Millar & Son, Utica, N. Y.; Millar's patent Ratchet Cheese Press Screws; $5 each.....Certificate of Merit.

Charles Millar & Son, Utica, N. Y.; Millar's Patent Rubber Rings, for pressing cheeses; sixty cents each.....Certificate of Merit.

Charles Millar & Son, Utica, N. Y.; Millar's Improved Tin Milk-pails, $1.50 each.....Certificate of Merit.

Charles Millar & Son, Utica, N. Y.; Millar's Metallic Cheese Hoops; $5 each. Certificate of Merit.

Charles Millar & Son, Utica, N. Y.; Milk-weighing Cans, for cheese factories; $16.....Certificate of Merit.

J. P. Corbin, Whitney's Point, N. Y.; the Eureka Butter-worker; $7. Certificate of Merit.

Chamberlain, Smith & Co., Cortland, N. Y.; Dog-power, for churning; $20. Certificate of Merit.

Wm. Ralph & Co., Utica, N. Y.; the American Curd Mill; single cylinder, $12; double cylinders, $18 and $24.....Certificate of Merit.

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Wm. Ralph & Co., Utica; N. Y.; Metallic Cheese Hoops, $4 each..... Certificate of Merit.

Wm. Ralph & Co., Utica, N. Y.; Cheese Factory Carrying Cans; $10..... Certificate of Merit.

O. O'Neil, Son & Co., Utica, N. Y.; Improved Metallic Cheese Hoops; $3.75 each.....Certificate of Merit.

O. O'Neil, Son & Co., Utica, N. Y.; Improved Carrying Can, for cheese factories; $9 each.....Certificate of Merit.

O. O'Neil, Son & Co., Utica, N. Y.; Improved Slanting Bottom Weighing Can, for cheese factories; $13.....Certificate of Merit.

O. O'Neil, Son & Co., Utica, N. Y.; a full assortment of press screws, curd knives, agitators, conductors, dairy pails, annatto, rennets, bandage, press cloth, strainer cloth, scale boards, cheese tryers, cream guages, test tubes, dairy thermometers, milk books, platform scales, salt scales, can handles, hoisting hooks, stencil plates, color and brushes..... ....Certificate of Merit.

Jones, Faulkner & Co., Utica, N. Y.; an English Curd Mill; $25. Certificate of Merit.

Jones, Faulkner & Co., Utica, N. Y.; general assortment of dairy apparatus and supplies, including silver plated thermometers, instruments for testing milk, annatto, cheese-bandage, &c., ...Certificate of Merit.

Jones, Faulkner & Co., Utica, N. Y.; Silver-steel Cheese Tryers; $1.50 each. Certificate of Merit.

E. A. Palmer, Clayville, N. Y.; Hook, for holding milk pans in wagons; 38 cents. .....Certificate of Merit.

E. A. Palmer, Clayville, N. Y.; Cheese Hoop and Ring, to press cheese in; 14½ inches diameter; $4..... Certificate of Merit.

Waldron & Sisson, Breakabeen, N. Y.; Dog or Sheep-power for Churning, a driving wheel 6 ft. 4 in. diameter, to be set at any desired pitch, with friction wheel (12 in.) and balance wheel (22 in.); 150 pounds; $15....Certificate of Merit.

C. S. Williamson, Covert, N. Y.; the Monitor Churn Power; 600 pounds; $65..... .....Certificate of Merit.

REPORT OF SPECIAL COMMITTEE ON DAIRY APPARATUS AT UTICA.

The special committee appointed to test dairy apparatus at the State fair, held at Utica, September 27th, 28th, 29th and 30th, 1870, in addition to the report then made and reserved to report on a future day, report as follows:

The tests were made with water and the temperature obtained by the use of six thermometers, placed at equal distances from the ends and sides of the several vats, and immersed each the same depth in the water.

A test was made with Wm. Ralph & Co.'s cheese vat "New Style," of the capacity of 500 gallons, with 400 gallons of water. Temperature of water was sixty-two degrees on surface and sixty degrees on bottom of vat. The temperature was taken at intervals of ten minutes, as follows: Ten minutes, mean temperature 63½ degrees; twenty minutes, mean temperature 68½ degrees; thirty minutes, mean temperature 74½ degrees; forty minutes, mean temperature, 79½ degrees; fifty minutes, mean temperature 83½ degrees; ninety minutes, mean temperature 98½ degrees; ninety minutes, mean temperature of water on bottom of vat was ninety-two degrees.

This vat has a detachable heater standing at the end of the vat, connected with the vat by two four-inch pipes with shut-offs or valves. One of these pipes conducts the heated water to a water chamber at the end of the vat; from there the water passes beneath a false bottom on which rests the inner vat; from there the water is distri-

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buted under and around the vat; then passes over the false bottom and in contact with the inner vat, and conducted by the return pipe to the bottom of the heater. Fifty-four pounds of wood was consumed in raising the water to the temperature indicated.

A test was made with Charles Millar & Son's circulating coil heater and cheese vat No. 15, of the capacity of 600 gallons, with 500 gallons of water. Temperature of water was sixty-two degrees on surface and sixty-one degrees on bottom of vat. Temperature at intervals as follows: Ten minutes, mean temperature 62 degrees; twenty minutes, mean temperature 67¾ degrees; thirty minutes, mean temperature 72½ degrees; forty minutes, mean temperature 76¾ degrees; fifty minutes, mean temperature 80¾ degrees; ninety-four minutes, mean temperature 99 degrees; ninety-four minutes, mean temperature of water on bottom of vat was 94½ degrees.

This vat was heated with Miller's patent circulating coil heater, with iron pipes extending along each side of the bottom of the vat, with return pipes perforated for distributing the heated water under and around the inner vat, with pipe in bottom to return water from vat to the coil heater. Sixty-nine pounds of wood was consumed in the heating of tank and the water in the vat to the temperature indicated. The circulating heater and the detachable heater of the "New Style" vat works on the principle that as the water becomes heated it forces itself out through the pipes under the vat, the cold water being forced into the tank, thus keeping up a continuous circulation.

A test was made with Ralph's Oneida cheese vat No. 15, of the capacity of 600 gallons, with 500 gallons of water. Temperature of water was sixty degrees on surface and on bottom of vat. Temperature at intervals as follows: Ten minutes, mean temperature 64¾ degrees; twenty minutes, mean temperature 68 degrees; thirty minutes, mean temperature 75¾ degrees; forty minutes, mean temperature 83½ degrees; fifty minutes, mean temperature 90 degrees; sixty-five minutes, mean temperature 99 degrees; sixty-five minutes, mean temperature of water on bottom of vat was 95¾ degrees.

This vat, the space between the outer and inner vats, was filled with water which was heated with a horizontal tubular fire-box running under the whole length of the inner vat, with smoke-stack from the rear end. Around the fire-box is a space for the water, communicating the whole length with the water space between the vats. Over the heater, in the space between the two vats, is what is termed an "Equalizer," which compels the heated water to circulate to all parts around the vat. Fifty-four pounds of wood was consumed to bring the water in the vat to the temperature above indicated.

In making these tests the water in the vats was kept as free as possible from any agitation. The "New Style" and Ralph's Oneida vats stood out, while the Millar vat was under shelter. The "New Style," standing exposed to the sun, showed two degrees difference in temperature between the top and bottom of the water in the vat. The Millar vat, standing under shelter, received less of the effects of the sun, causing a difference of only one degree in the temperature of surface and bottom. Ralph's Oneida vat, standing without shelter, was exposed to a cool atmosphere and wind, equalizing the top and bottom of the water in the vat.

The committee are of the opinion that to make the tests so that they shall show the working in its true light, the circumstances and conditions of all the vats should be the same. The cool wind and atmosphere tended to equalize the temperature of the top and bottom of the water in the Ralph's Oneida vat, while the effects of the sun had an opposite tendency in the case of the "New Style" and the Millar vat.

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Jones, Faulkner & Co., and O. O'Neil, Son & Co., exhibited cheese vats that were not tested.

The committee think it proper, aside from the tests, to take into account the construction of the several vats, irrespective of working qualities, it being desirable that a vat shall contain the essential elements approaching nearest to perfection. The inner vat should be made with as few seams as possible, and the seams be well filled, so that in passing a sponge or cloth over the surface in washing, it will touch every part of the vat. The angles of the vat should be rounded, so that there shall be no sharp corners or angles. In respect to these points the Millar and O'Neil vats approached nearest, the latter being of the best workmanship. These vats were made from large sheets of tin varying from five to thirteen pieces to each, according to size of vat.

The committee find that the Oneida vat used less fuel, required less time, and distributed the heat more evenly, than the Millar vat. The trials of these vats were made, however, under different circumstances, which, in the opinion of the committee, tended, in some degree, to produce the difference above named. In the distribution of the heat both vats indicated the skill of the manufacturers, and that almost perfect success in this respect had been attained.

The committee recommend the award of the first premium to the Oneida vat, for the economy in fuel and perfection of its workings, and also would recommend the award of a suitable premium to the Millar vat for successful working and superior workmanship in the construction.

HARRIS LEWIS, Frankfort.
JOSIAH SHULL, Ilion.
T. W. MOORE, New Hartford.
MORGAN BUTLER, New Hartford.

CLASS V.—FARM PRODUCE.

No. 22. GRAIN, SEEDS, HOPS, GROWN IN 1870.

White winter wheat.

First prize, O. Howland, Auburn, N. Y., "Diehl"	$10
Second, Robert Bell, West Brighton, N. Y.	5

Red winter wheat.

First prize, O. Howland, Auburn, N. Y., "Red Mediterranean"	10
Second, Wm. P. Ottley, Phelps, N. Y.	5

White oats.

First prize, Wm. Newton, Henrietta, N. Y., "Excelsior"	10
Second, John Stryker, Rome, N. Y., "Surprise"	5

Black or gray oats.

First prize, John Stryker, Rome, N. Y., "Norway"	10
Second, J. Corbin, Liverpool, N. Y.	5

Winter barley.

First prize, O. Howland, Auburn, N. Y.	10

Two-rowed spring barley.

First prize, O. Howland, Auburn, N. Y.	10
Second, Wm. P. Ottley, Phelps, N. Y.	5

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Four-rowed spring barley.

First prize, Robert Bell, West Brighton, N. Y. $10
Second, O. Howland, Auburn, N. Y. 5

Yellow Indian corn, shelled.

First prize, T. K. Tibbits, New Hartford, N. Y. 10
Second, J. Corbin, Liverpool, N. Y., improved Dutton 5

Field beans, large.

First prize, L. L. French, Richfield Springs, N. Y. 10
Second, Horace Ames, Moscow, N. Y. 5

Field beans, small.

First prize, State Lunatic Asylum, Utica, N. Y. 10

Field peas, large.

First prize, L. L. French, Richfield Springs, N. Y., black-eyed Marrowfat.... 10

Buckwheat.

Second prize, O. Howland, Auburn, N. Y. 3

Twelve seed ears yellow corn.

First prize, William Newton, Henrietta, N. Y. 5
Second, J. Corbin, Liverpool, N. Y. 3

Twelve seed ears white corn.

First prize, William Newton, Henrietta, N. Y., Sanford variety 5
Second, Abram Stone, Stanwix, N. Y. 3

Twelve seed ears early sweet corn.

First prize, J. Corbin, Liverpool, N. Y. 5
Second, C. W. Crosman, Rochester, N. Y. 3

Twelve seed ears late sweet corn.

First prize, C. W. Crosman, Rochester, N. Y. 5
Second, John Stryker, Rome, N. Y. 3

Bale of hops, one hundred pounds or over.

First prize, John Stryker, Rome, N. Y. 10
Second, Jos. B. Cushman, 2d, Vernon, N. Y. 5

No. 23. VEGETABLES.

Twelve roots celery.

First prize, State Lunatic Asylum, Utica, N. Y. 3
Second, Robert Oliver, Oswego, N. Y. 2

Cauliflowers.

First prize, Robert Oliver, Oswego, N. Y. 3
Second, State Lunatic Asylum, Utica, N. Y. 2

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Cabbages.

First prize, Robert Oliver, Oswego, N. Y.	$3
Second, C. W. Crosman, Rochester, N. Y.	2

Lettuce.

First prize, C. W. Crosman, Rochester, N. Y.	3
Second, State Lunatic Asylum, Utica, N. Y.	2

Turnips.

First prize, State Lunatic Asylum, Utica, N. Y.	3
Second, C. W. Crosman, Rochester, N. Y.	2

Mangolds and Beets.

First prize, C. W. Crosman, Rochester, N. Y.	3
Second, Briggs & Bro. Rochester, N. Y.	2

Orange Carrots.

First prize, Robert Oliver, Oswego, N. Y.	3
Second, C. W. Crosman, Rochester, N. Y.	2

White carrots.

First prize, C. W. Crosman, Rochester, N. Y.	3

Parsneps.

First prize, Robert Oliver, Oswego, N. Y.	3
Second, State Lunatic Asylum, Utica N. Y.	2

Salsify.

First prize, C. W. Crosman, Rochester, N. Y.	3
Second, State Lunatic Asylum, Utica, N. Y.	2

Kohl-rabi.

First prize, State Lunatic Asylum, Utica, N. Y.	3

Onions.

First prize, C. W. Crosman, Rochester, N. Y.	3
Second, State Lunatic Asylum, Utica, N. Y.	2

Tomatoes.

First prize, Briggs & Brother, Rochester, N. Y.	3
Second, C. W. Crosman, Rochester, N. Y.	2

Egg plants.

First prize, John Stryker, Rome, N. Y	3
Second, State Lunatic Asylum, Utica, N. Y.	2

Garden beans.

First prize, Mrs. J. T. Van Namee, Pittstown N. Y.	3
Second, C. W. Crosman, Rochester, N. Y.	2

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Peppers.

First prize, State Lunatic Asylum, Utica, N. Y. $3
Second, C. W. Crosman, Rochester, N. Y. 2

Squashes.

First prize, Robert Oliver, Oswego, N. Y. 3
Second, Briggs & Brother, Rochester, N. Y. 2

Field pumpkins.

First prize, John Stryker, Rome, N. Y. 3
Second, David Pugh, Marcy, N. Y. 2

Sweet potatoes.

First prize, James Chrisman, Oriskany, N. Y. 3
Second, State Lunatic Asylum, Utica, N. Y. 2

Potatoes.

First prize, C. W. Crosman, Rochester, N. Y. 3
Second, Robert Oliver, Oswego, N. Y. 2

Collections of vegetables.

First prize, C. W. Crosman, Rochester, N. Y. 10
Second, Robert Oliver, Oswego, N. Y. 5

No. 24. FLOUR, ETC.

White wheat flour, with sample of the wheat and statement of the quantity used to make the barrel of flour.

First prize, M. E. Myers, Charlton, N. Y. $10

Hominy.

First prize, Abram Stone, Stanwix, N. Y. 5

O. K. RICE, Greenwich.
C. B. WAY, Camillus.

No. 25. BUTTER.

Fifty pounds June butter.

First prize, John Stryker, Rome, N. Y. $20
Second, John Shattuck, Norwich, N. Y. 15
Third, Jane Morris, New York Mills, N. Y. 10

Fifty pounds of butter made at any time.

First prize, Jane Morris, New York Mills, N. Y. 20
Second, L. L. French, Richfield Springs, N. Y. 15
Third, John Shattuck, Norwich, N. Y. 10

Five pounds butter in one pound rolls.

First prize, Mrs. Abram Stone, Stanwix, N. Y. 10
Second, David Pugh, Marcy, N. Y. 5

No. 26. CHEESE.

American cheese, factory or other, over one year old, not less than forty pounds weight.

First prize, J. Ellison Middleville, N. Y. $20
Second, M. E. Myers, Charlton, N. Y. 15
Third, M. E. Myers, Charlton, N. Y. 10

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American cheese, factory or other, less than one year old.

First prize, M. E. Myers, Charlton, N. Y.; private dairy..... $20

Five cheeses.

First prize, L. L. Wight, Whitesboro', N. Y., made at Whitesboro' Factory, Oneida county, N. Y..... 20
Second, Clear Spring Factory, Fredonia, N. Y..... 15
Third, John Brown, Rome, N. Y..... 10

Three factory made cheeses.

First prize, La Dewville Cheese Factory, Norway, N. Y..... 15
Second, A. L. Fish, Cedarville, N. Y..... 10
Third, Clear Spring Cheese Factory, Fredonia, N. Y..... 5

Three cheeses made in private dairy.

Second prize, M. E. Myers, Charlton, N. Y..... 10

Three prepared rennets.

First prize, Mrs. W. H. Graves, Blossvale, N. Y..... 10
Second, Mrs. W. Halstead, Blossvale, N. Y..... 5
Utley, Kimball & Reynolds, Watertown, N. Y.; Paper Box and Bandage for Cheese.....Certificate of Merit.
A. M. Utley, Watertown, N. Y.; for J. Blood's Patent Adjustable Paper Box and Bandage for Cheese.....Certificate of Merit.

The judges of butter and cheese, in making their report, beg leave to remark that the show of dairy products was very much less than could have been expected at a State fair, located at the centre of the great dairy district of this State. The entries both for butter and cheese, were less than we have seen at some town exhibitions; but the samples shown, with a few exceptions, were *fine*, and in two or three instances may be regarded as "fancy."

The committee in making their awards on cheese, adopted a "scale of points" by which to govern their decisions, viz.: flavor, quality, texture or solidity, color, style, and general appearance.

In butter, the points were flavor or sweetness, color, texture or grain, evenness of salt, freedom from buttermilk, and manner of packing.

Of cheese, more than one year old, there were but two exhibitors, and both samples were only fair.

The cheese from the North Fairfield factory was exceedingly fine and fully came up to the standard of extra or fancy. This entry being too late for competition, the committee thought worthy of special notice, and recommend awarding a certificate of merit.

We also call attention to small cheese of an oblong form on exhibition, from the factory of A. Holdridge, of Otsego county, and manner of making and pressing the same.

The Combined Paper Box and Bandage of Uttley, Kimball and Reynolds, of Watertown, N. Y., was a novel feature in this line of dairy furnishing goods, which attracted much attention and favorably impressed the committee as deserving special notice.

The committee was greatly pleased with the show of dairy and other salt, exhibited by the Onondaga Salt Co. The factory filled dairy salt, for dairy purposes, we think, is superior to any other brand we have seen, and we earnestly recommend its use in the dairy for both butter and cheese.

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No. 27. Bread, Sugar, etc.

Wheaten bread.

First prize, M. E. Myers, Charlton, N. Y. $5
Second, Mrs. L. D. Babcock, Clarkson, N. Y. 3

Rye bread.

First prize, M. E. Myers, Charlton, N. Y. 5
Second, E. B. Wetmore, Westmoreland, N. Y. 3

Rye and Indian bread.

First prize, M. E. Myers, Charlton, N. Y. 5
Second, E. B. Wetmore, Westmoreland, N. Y. 3

Maple sugar.

First prize, H. T. Brown, Lairdsville, N. Y. 5

Maple syrup.

First prize, H. T. Brown, Lairdsville, N. Y. 5

Honey.

First prize, Henry Grems, Rome, N. Y. 5
Second, Peter Miller, Fredonia, N. Y. 3

Preserved fresh fruits.

First prize, E. B. Wetmore, Westmoreland, N. Y. 5
Second, E. B. Wetmore, Westmoreland, N. Y. 3

Pickles in vinegar.

First prize, Mrs. Abram Stone, Stanwix, N. Y. 5

Dried apples.

First prize, H. T. Brown, Lairdsville, N. Y. 5
Second, Mrs. W. H. Graves, Blossville, N. Y. 3

Dried whortleberries.

First prize, Mrs. W. H. Graves, Blossvale, N. Y. 5

Dried raspberries.

First prize, Peter Miller, Fredonia, N. Y. 5
Second, Mrs. W. H. Graves, Blossvale, N. Y. 3

Peter Miller, Fredonia N. Y., for improved Bee Feeder ..... Certificate of Merit.
V. Leonard, Springfield, Penn.; for Bee Hive ..... Certificate of Merit.
T. R. Allen, Syracuse, N. Y.; for Bee Hive and Queen Nursery for rearing queen bees ..... Certificate of Merit.
Henry Grems, Rome, N. Y.; Bee Hive ..... Certificate of Merit.
G. W. C. Gillespie, Grinnell, Iowa, for Gould's "Common Sense" bee hive, and exhibition of bees and honey, the hive combining all essentials and being of cheap construction ..... Certificate of Merit.

X. A. WILLARD, Little Falls.
THOS. W. MOORE, New Hartford.
W. W. INGHAM, New York city

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No. 28. WINES, ETC.

Cider vinegar.

First prize, Pomeroy Jones, Lairdsville, N. Y. $5
Second, E. Ware Sylvester, Lyons, N. Y. 3

No. 29. DOMESTIC MANUFACTURES.

Pairs woolen blankets.

First prize, Mrs. Charity Hakes, Stanwix, N. Y. 5
Second, Phebe Brownell, Bethlehem Centre, N. Y. 3

All-wool horse blankets.

Second prize, Mrs. Abram Stone, Stanwix, N. Y. 3

Ten yards woolen cloth.

First prize, Mrs. W. H, Graves, Blossvale, N. Y. 5

Ten yards woolen flannel.

First prize, Mrs. W. C. Burritt, Paris, N. Y. 5
Second, Harriet E. Lamb, Utica, N. Y. 3

Ten yards flannel, cotton warp.

First prize, Harriet E. Lamb., Utica, N. Y. 5
Second, Mrs. W. Halstead, Blossvale, N. Y. 3

Ten yards linsey woolsey.

First prize, Mrs. W. H. Graves, Blossvale, N. Y. 5

Ten yards cotton and wool kersey.

First prize, Harriet E. Lamb, Utica, N. Y. 5
Second, Phebe Brownell, Bethlehem Centre, N. Y. 3

Ten yards woolen carpet.

First prize, Mrs. Charity Hakes, Stanwix, N. Y. 5

Ten yards rag carpet.

First prize, Mrs. Ann Tillson, Washington Mills, N. Y. 5
Second, Mrs. O. Comstock, Westmoreland, N. Y. 3

Hearth rugs.

First prize, Mrs. O. Comstock, Westmoreland, N. Y. 5
Second, Mrs. Abram Stone, Stanwix, N. Y. 3

Double carpet coverlets.

First prize, Mrs. W. Halstead, Blossvale, N. Y. 5

Knit bed spreads.

First prize, Mrs. O. B. Gridley, Deansville, N. Y. 3

Quilted bed spreads.

First prize, Mrs. Harry Rose, Utica, N. Y. 3

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Balmoral petticoats.

First prize, Mrs. W. H. Graves, Blossvale, N. Y..... $3
Second, Mrs. W. C. Burritt, Paris, N. Y..... 2

Woolen knit stockings.

First prize, Mrs. W. H. Graves, Blossvale, N. Y..... 3
Second, Mrs. Harry Rose, Stanwix, N. Y. 2

Worsted knit stockings.

First prize, Harriet E. Lamb, Utica, N. Y..... 3
Second, Mrs. W. C. Burritt, Paris, N. Y..... 2

Woolen knit mittens.

First prize, Mrs. W. H. Graves, Blossvale, N. Y..... 3
Second, Mrs. W. C. Burritt, Paris, N. Y..... 2

Woolen fringe mittens.

First prize, Phebe Brownell, Bethlehem Centre, N. Y..... 3
Second, Mrs. Abram Stone, Stanwix, N. Y..... 2

Woolen socks by girls under twelve.

First prize, Mrs. W. C. Burritt, Paris, N. Y..... 3
Second, Mrs. W. H. Graves, Blossvale, N. Y..... 2

Woolen yarn by girls under twelve.

First prize, Mrs. W. Halstead, Blossvale, N. Y..... 3
Second, Mrs. W. H. Graves, Blossvale, N. Y..... 2

Ten yards linen cloth.

First prize, Harriet E. Lamb, Utica, N. Y..... 5
Second, Mrs. W. Halstead, Blossvale, N. Y..... 3

Ten yards linen diaper.

First prize, Phebe Brownell, Bethlehem Centre, N. Y..... 5
Second, Harriet E. Lamb, Utica, N. Y 3

Ten yards linen kersey.

Second prize, Mrs. W. H. Graves, Blossvale, N. Y..... 3

Ten yards tow cloth.

First prize, Phebe Brownell, Bethlehem Centre, N. Y..... 5

Linen knit stockings.

First prize, Harriet E. Lamb, Utica, N. Y..... 3
Second, Phebe Brownell, Bethlehem Centre, N. Y..... 2

Cotton knit stockings.

First prize, Mrs. W. C. Burritt, Paris, N. Y..... 3

One pound linen sewing thread.

First prize, Mrs. W. Halstead, Blossvale, N. Y..... 3
Second, Mrs. W. H. Graves, Blossvale, N. Y..... 2

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Extra awards.

Mary Whitney, Rochester, N. Y., Affghan	$5
J. V. Roby, New Hartford, N. Y., Cotton Batting	2
Mrs. J. Marshall Guion, Seneca Falls, N. Y., Embroidered Carriage Affghan	3

L. C. KILHAM, Oneida.
JOSEPH E. ELY, Binghamton.
EDWARD HARPUR, Harpersville.

CLASS VI.—FLOWERS, PLANTS, DESIGNS AND FRUITS.

No. 30. FLOWERS—PROFESSIONAL LIST.

Cut flowers.

For the best display, James Vick, Rochester, N. Y.	$10
Second, Briggs & Brother, Rochester, N. Y.	5

Dahlias.

Best collection, James Vick, Rochester, N. Y.	6
Second, C. W. Crosman, Rochester, N. Y.	3
Best 24 dissimilar blooms (with names), James Vick, Rochester, N. Y.	5
Second, Henry Wagoner, Utica, N. Y.	3
Best 12 dissimilar blooms (with names), James Vick, Rochester, N. Y.	3
Second, C. W. Crosman, Rochester, N. Y.	1

Roses.

For the greatest number of the newest and best varieties, Ellwanger and Barry, Rochester, N. Y.	6
Second, Henry Wagoner, Utica, N. Y.	3
For the newest and best 24 distinct varieties, with names, Ellwanger and Barry, Rochester, N. Y.	5
For the newest and best 12 varieties, with names, Ellwanger & Barry, Rochester, N. Y.	3

Phloxes.

For the greatest number of newest and best varieties, James Vick, Rochester, N. Y.	5
Second, Briggs & Brother, Rochester, N. Y.	3
For the best 12 varieties, with names, Henry Wagoner, Utica, N. Y.	3
Second, James Vick, Rochester, N. Y.	1
For the best new seedling, not before exhibited, James Vick, Rochester, N. Y.	1

Verbenas.

For the greatest number of newest and best varieties, Henry Wagoner, Utica, N. Y.	5
Second, James Vick, Rochester, N. Y.	3
Newest and best 12 varieties, with names, F. W. Boyce, Utica, N. Y.	3
Second, Henry Wagoner, Utica, N. Y.	1
Best collection, 3 varieties American seedlings, not before exhibited, James Vick, Rochester, N. Y.	1

German Asters.

Best collection, James Vick, Rochester, N. Y.	3
Second, Briggs & Brother, Rochester, N. Y.	1

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Pansies.

Best collection, Briggs & Brother, Rochester, N. Y. $3
Second, James Vick, Rochester, N. Y. 1

Ten week stocks.

Best collection, James Vick, Rochester, N. Y. 3
Second, Briggs & Brother, Rochester, N. Y. 1

Gladiolus.

Best collection, James Vick, Rochester, N. Y. 3
Second, Briggs & Brother, Rochester, N. Y. 1

No. 31. FLOWERS—AMATEUR LIST.

Cut flowers.

For the best display, Mrs. J. T. Van Namee, Pittstown, N. Y. 10

Dahlias.

Greatest number of the newest and best varieties, Mrs. J. T. Van Namee, Pittstown, N. Y. 6
Best 12 dissimilar blooms, with names, Mrs. J. T. Van Namee, Pittstown, N. Y. 3
Best six dissimilar blooms, Mrs. J. T. Van Namee, Pittstown, N. Y. 2

Roses.

For the greatest number of newest and best varieties, Mrs. J. T. Van Namee, Pittstown, N. Y. 6
Best twelve varieties, with names, Mrs. J. T. Van Namee, Pittstown, N. Y... 3
Best six varieties (named), Mrs. J. T. Van Namee, Pittstown, N. Y. 2

Carnations.

Best display of monthly carnations, Mrs. J. T. Van Namee, Pittstown, N. Y, 3

Verbenas.

Greatest number of newest and best varieties, Mrs. J. T. Van Namee, Pittstown, N. Y. 5
Best twelve distinct varieties, with names, Mrs. J. T. Van Namee, Pittstown, N. Y. 3
Best six varieties, with names, Mrs. J. T. Van Namee, Pittstown, N. Y. 2

Phloxes.

Greatest number of newest and best varieties, annual, Mrs. J. T. Van Namee, Pittstown, N. Y. 5
Best annual, Mrs. J. T. Van Namee, Pittstown, N. Y. 2

German Asters.

Best collection, Mrs. J. T. Van Namee, Pittstown, N. Y. 3

Ten week stocks.

Best display, Mrs. J. T. Van Namee, Pittstown, N. Y. 3

Everlasting flowers.

Best display, Mrs. J. T. Van Namee, Pittstown, N. Y. 3
Second, Harriet E. Lamb, Utica, N. Y. 1

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No. 32. PLANTS AND BOUQUETS, ETC.—GENERAL LIST. OPEN TO ALL COMPETITORS.

Pot plants.

Best collection of house plants in pots, to consist of twenty different specimens; the variety of the plants, and the manner in which they are grown, to be taken into account, J. W. Alexander, Utica, N. Y. $10
Second Henry Wagoner, Utica, N. Y. 5

Floral design or ornament.

Best, Mrs. J. T. Van Namee, Pittstown, N. Y. 5

Bouquets.

Best pair hand, Henry Wagoner, Utica, N. Y. 5
Second, J. W. Alexander, Utica, N. Y. 3
Best pair parlor, Henry Wagoner, Utica N. Y. 5
Second, Ellwanger & Barry, Rochester, N. Y. 3
Best basket bouquet, J. W. Alexander, Utica, N. Y. 5
Second, C. W. Crosman, Rochester, N. Y. 3
Best display of newly introduced flowers, not contained in the foregoing lists, either in pots or cut flowers, James Vick, Rochester, N. Y. 5

F. R. ELLIOTT, Cleveland.
EDWARD NORTH, Clinton.

No. 33. FRUITS—PROFESSIONAL LIST.

Apples.

Best 40 varieties and best specimens, correctly named, at least 3 specimens of each, E. Ware Sylvester, Lyons, N. Y. 15
Second, Ellwanger & Barry, Rochester, N. Y. 10
For the best 20 varieties, best grown and correctly named, 3 specimens of each, E. Ware Sylvester, Lyons, N. Y. 10

Pears.

Best 20 varieties and best specimens, correctly named, 3 specimens of each variety, Ellwanger & Barry, Rochester, N. Y. 15
For best 15 varieties, best specimens of each, Ellwanger & Barry, Rochester, N. Y. 10
Second, E. Ware Sylvester, Lyons, N. Y. 5
For the best 10 varieties and best specimens, 6 of each, correctly named, Ellwanger & Barry, Rochester, N. Y. 8

Plums.

Best 12 varieties and best grown specimens, 6 of each, correctly named, Ellwanger & Barry, Rochester, N. Y. 5
Best 6 varieties, 6 specimens of each, Ellwanger & Barry, Rochester, N. Y. 3
Best 1 variety, 12 specimens, Ellwanger & Barry, Rochester, N. Y. 1

Quinces.

Best dozen apple or orange, Ellwanger & Barry, Rochester, N. Y. 3

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Grapes.

For the greatest number of good native varieties and best grown specimens, 3 bunches each, R. B. Shaw, Canandaigua, N. Y..... $5
Second, Ellwanger & Barry, Rochester N. Y..... 3
For the best 1 variety, 6 bunches, S. W. Underhill, Croton Point, N. Y..... 2

Watermelons.

For the greatest number of varieties and the best specimens, Briggs & Brother, Rochester, N. Y..... 3
Second, C. W. Crosman, Rochester, N. Y 2

Muskmelons.

For the greatest number of varieties and best specimens, Briggs & Brother, Rochester, N. Y..... 3
For the best specimen of any variety, C. W. Crosman, Rochester, N. Y 1

No. 34. Fruits—Amateur List.

Apples.

Best 20 varieties and best specimens, correctly named, at least 3 specimens of each, James S. Foster, New Hartford, N. Y..... 12
Second, Robert Bell, West Brighton, N. Y..... 3
For the best 15 varieties, best grown and correctly named, 3 specimens of each, Robert Bell, West Brighton, N. Y. 10
Second, James S. Foster, New Hartford, N. Y. 5
For the best 10 varieties, correctly named, 6 specimens of each, Robert Bell, West Brighton, N. Y. 5
Second, James S. Foster, New Hartford, N. Y. 3

Pears.

Best 15 varieties and best specimens, correctly named, 3 specimens of each variety, O. B. Gridley, Deansville, N. Y..... 12
Second, Robert Bell, West Brighton, N. Y..... 8
For best 10 varieties, best specimens and correctly named, 3 specimens of each, Robert Bell, West Brighton, N. Y..... 10
Second, James S. Foster, New Hartford, N. Y..... 5
For the best 6 varieties and best specimens, 6 of each, correctly named, Robert Bell, West Brighton, N. Y..... 3
Second, Grove Penny, Utica, N. Y..... 4

Plums.

Best 10 varieties and best grown specimens, 6 of each, correctly named, G. W. Lawrence, Oswego, N. Y..... 5
Best 1 variety, 12 specimens, G. W. Lawrence, Oswego, N. Y..... 2

Quinces.

Best dozen apple or orange, Robert Bell, West Brighton, N. Y 2
Second, B. W. Churchill, Kirkland, N. Y..... 3

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EXTRACTS FROM DR. VOELCKER'S REPORTS,* 1869-70.

ARTIFICIAL MANURES, ETC.

The supply of Peruvian guano of best quality, unfortunately, is diminishing from year to year, and the rise in the price of guano has encouraged, to a larger extent than formerly, the fraudulent practices of unprincipled dealers.

In the spring of the year, several highly adulterated guanos were sent to me for analysis; but the timely warning given in my reports, in most cases, guarded the sender against imposition, and loss of money and crops. It has come under my notice that guano has been offered for sale by auction, professing to be equal in quality to samples analyzed by me, and represented in the analysis shown at the public sale as good guano. The bulk on delivery, however, has been found to have only a remote resemblance with the guano as represented in the analysis handed round at the public sale. The transaction was so cautiously managed, however, that no legal remedy could be applied to recover damages, and several farmers who purchased the guano on the strength of my analysis, were grossly deceived. I would, therefore, strongly urge upon agriculturists on no account, to purchase guano which is offered for sale by auction. Besides adulterated Peruvian guanos, artificial mixtures resembling in appearance guano, were brought under my notice last season, professing to be peculiar kinds of phosphatic guanos. Such mixtures generally contain a little real guano, and the bulk consists of earthy matter of little or no fertilizing value. These manures do not profess to be Peruvian guano, but to come from some island or the other, the existence of which often occurs only on paper; and as these guanos are always sold at a low figure they find purchasers, although no guarantee as regards composition is given. In all cases in which guano is sold without an analysis, the purchaser runs the risk of being imposed upon.

Compound artificial manures which are offered for sale at a low price, varying from £3 to £5, a ton, in most cases, are not worth one-half or one-third the money which is asked for them; and, in some instances brought under my notice during the past season, the manures

* From the Journal of the Royal Agricultural Society of England.

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sent to me for analysis, were not worth the carriage to a distance of ten miles.

Particular caution ought to be used by intending purchasers, in cases in which artificial manures are offered for sale at a low figure under the names of British guano, blood or fish manure, or a similar enticing name. Frequently such have nothing in common with guano, or with fish or blood except the name.

In illustration of these remarks, I may give the analysis of a sample of Pound's British guano, which was sent to me last spring by a member of the Society:

Composition of Pound's British Guano.

Moisture	18.97
Organic matter and water in combination*	20.27
Oxide of iron and alumina	2.21
Sulphate of lime, and a little carbonate of lime	55.11
Sand	3.44
	100.00

This so called British guano, it will be seen, yielded only 1⅓ per cent of ammonia and contained no phosphate of lime whatever, nor any alkaline salts. On the other hand, it contained a good deal of water and a high per centage of gypsum. In point of fact the sample of Pound's British guano analyzed by me, was nothing else but a mixture of gypsum and some rather strong-smelling organic refuse matter. It was sold at £5 5s. a ton but is scarcely worth more than 30s. a ton.

It is to be greatly feared that with the near approach of the time when the supplies of the best Peruvian guano from the Chincha Islands will be finally stopped, inferior descriptions of guano will find their way into the wholesale guano trade, and be eagerly bought up for the purpose of mixing with the best Peruvian guano,

I have recently analyzed two samples of guano from the Guanape Islands, and find that both representing large cargoes recently imported into England, were much inferior to Chincha Island guano, as will be seen by the subjoined analysis:

*Containing nitrogen	1.09
Equal to ammonia	1.32

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Composition of Guanape Guano

	No. 1.	No. 2.
Moisture	17.79	20.10
Organic matter and ammoniacal salts*	42.62	38.67
Phosphates of lime and magnesia (bone phosphates)	25.45	32.53
Alkaline salts†	11.92	5.97
Sand	2.22	2.73
	100.00	100.00

These samples, especially the second, were much damper than best Peruvian guano, and much poorer in ammonia. No. 2, indeed, only contained about half the amount of ammonia which occurs in best Chincha Island guano. The preceding analyses, moreover, show evidently that the guano from the new guano islands (Guanape Islands) is not uniform in character. If these samples fairly represent the general character of Guanape guano, and there is reason to fear they do, it is evident that the guano on the Guanape Islands, is deposited in a region which is visited by occasional rains or heavy dews, which, I need hardly say, wash out the most valuable constituents of guano.

A considerable number of samples of nitrate of soda were sent to the laboratory last spring, and of these, several were found to be largely adulterated with common salt.

The demand for superphosphate of lime, dissolved bones, and similar artificials, is increasing from year to year, and, generally speaking, most manures of that description are well worth the price at which they are offered for sale. More than 100 samples of phosphatic manures were analyzed by me last season, and most were found equal to the guaranteed analysis by which they were sold.

With respect to feeding cakes, I am glad to be able to report that a decided improvement has taken place in the cake transactions. Several firms, who formerly sold only mixed cakes, have recently begun to make pure linseed cake. Best decorticated cotton cake is again obtainable at a fair price in the English market, and some excellent samples have been remitted for analysis. In speaking of decorticated American cotton-cake, I would reiterate the remark made on a former occasion, that this cake is too rich in nitrogenous or flesh-forming matters to suit, unmixed, the health of herbivorous animals. It should always be given together with some food rather

* Containing nitrogen	10.04	7.87
Equal to ammonia	11.40	8.95
† Containing soluble phosphoric acid	4.75	3.19
Equal to tribasic phosphate of lime	10.37	6.96

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poor in nitrogenous matters, and but in moderate quantities during the summer period of the year. During cold weather, in the winter, it may more freely be given to stock than during the summer months, and at all times it is desirable to give with it an abundant supply of succulent root feed, or, in the absence of roots, some bulky food, such as chaff, and food rather poor in nitrogenous matter, such as palm nut meal or Indian corn.

Green German rape, or Rubsen cake, has much risen in price, and is difficult to obtain quite free from mustard. In buying rape-cake, it is always desirable to have it tested whether it is free from any injurious amount of mustard seed. Several samples of rape cake sent for analysis, were found to be quite unfit for feeding purposes.

Adulterated linseed-cakes are still found in the market, though less abundantly than formerly. A novel kind of admixture to linseed cake, I found to be the admixture of cocoanut fibre. Cocoanut fibre, I need scarcely say, possesses no nutritive properties. The expressed pulp of the cocoanut, on the contrary, contains as much oil as linseed cake, and is a useful feeding material, as the following analysis of a sample recently examined will show:

Composition of Cocoanut Cake.

Moisture	8.97
Oil	11.44
Albuminous compounds (flesh forming matters)*	20.75
Gum, mucilage, sugar and digestible fibre	39.41
Woody fibre (cellulose)	14.27
Mineral matter (ash)	5.16
	100.00

Cocoanut cake, which is largely produced in the manufacture of cocoanut oil, rarely passes into the hands of the farmer; and, judging from its presence in mixed linseed cakes, it is probably bought up by oil cake makers, and used for adulterating linseed cake.

Potash Salts as Manures.

In reviewing the field experiments which, for a number of years, I have instituted with special reference to the conditions under which the land is benefited by the direct supply of potash in the shape of salts of potash, I have come to the conclusion, as far as my present experience goes, that these salts may often be applied with advantage to potatoes, clover, beets, and turnips.

*Containing nitrogen 3.32

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In several experiments, tried on poor sandy soils during the past season, the addition of crude potash salts to superphosphate of lime had a very marked and decidedly beneficial effect on the potato crop, and also on swedes. Even when applied alone, crude potash salts benefit materially root crops growing on poor sandy land. The same beneficial effects, I find by direct experiments, cannot be obtained by the application of common salt, showing that soda is a much less valuable fertilizing constituent than potash, and incapable of replacing the functions of the latter in the vegetable economy.

Hitherto the price of potash has stood in the way of its being employed on an extended scale in agriculture. Even in its cheapest form, that of crude German potash salts, potash was too dear for practical application in agriculture. But as potash will, no doubt, be extensively used in agriculture, if it can be had at a cheap rate, I have pleasure in directing attention to a mineral called kainite, which is found in the neighborhood of Stassfurth, in Saxony, and which, in round numbers, contains twenty-four per cent of sulphate of potash, and twelve per cent of sulphate of magnesia. This saline mineral can now be obtained in England, in a finely-ground condition, ready for mixing with other artificial manures, at about £3 3s. per ton, and probably for less when considerable quantities are required. From three to four cwt. of ground kainite, mixed with an equal quantity of superphosphate of lime per acre, has been found of great utility in the sugar-beet-growing districts of north Germany; and I have no doubt it will be found equally useful in England, where root crops are intended to be raised upon naturally poor or upon exhausted sandy soil. The crop, however, most likely to be greatly benefited by this potash manure is the potato.

On light soils I would strongly recommend, as a manure for potatoes, the following mixture: Four to five cwts. of kainite (crude German potash); four cwts. of Peruvian guano; and four cwts. of superphosphate of lime.

In buying kainite as a source of potash, care should be taken to have a sample of the bulk tested for the amount of potash which it contains; for not only are some of the samples offered for sale very poor in potash, but some contain scarcely any potash at all. Quite recently one of the members of the Society sent me a sample of so-called kainite for analysis, which contained a mere trace of potash, and was found to be composed of impure sulphate of magnesia, dried hard and partially deprived of its water of crystallization, and then ground fine.

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Good kainite should contain about thirteen per cent of potash, and should dissolve in water without having any considerable residue.

The following analysis may be taken as fairly representing the

COMPOSITION OF A GOOD SAMPLE OF KAINITE.

Moisture (loss at 212° Fahr.),	3.36
Water of combination,	10.88
Sulphate of potash*	24.43
Sulphate of lime,	2.72
Sulphate of magnesia,	13.22
Chloride of magnesium,	14.33
Chloride of sodium,	30.35
Insoluble siliceous matter,	.71
	100.00

ON SUGAR-BEETS AND BEET-ROOT DISTILLATION.

The existence of crystallizable sugar in beet-roots was discovered in 1747 by the Berlin chemist, Marggraf, who obtained from this root from four and a half to six per cent of sugar, identical in all its essential points with that derived from sugar-cane.

For fully half a century Marggraf's discovery attracted but little attention in non-scientific circles; and bore little or no practical fruits until the beginning of the present century.

Experimentally, no doubt, sugar was extracted from beet-root long before Napoleon I. encouraged so greatly the establishment of beet-root sugar factories on the Continent; but, on a commercial scale, beet-root sugar was, probably, not produced before 1809.

Encouraged by Napoleon I., and aided by the scientific labors of several French chemists and the sound judgment and knowledge of one of Napoleon's ministers, the celebrated M. Chaptal, a man eminent for chemical and general scientific attainments, the new industry, for a time, made rapid progress. It sustained a temporary check soon after Napoleon's fall, and vexatious and injudicious fiscal regulations at one time threatened to crush altogether the beet-root sugar industry on the Continent. However, increased knowledge, and the spread of sounder commercial principles, gave a fresh impulse to the beet-root sugar industry; and, considering the difficulties under which it had to struggle at first, its progress has been rapid, especially during the last ten years.

Since 1860, France has nearly doubled her production of beet-root

* Containing potash, 13.20.

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sugar, and equally great has been the development of the beet-sugar industry in north Germany and Belgium.

There are, at present, over 500 beet-root sugar factories and distilleries in France, nearly 200 in Belgium, about 300 in Prussia, and a good number in Austria, Russia, and other Continental States. Probably the number of continental beet-root sugar factories and distilleries does not fall much short of 2,000.

Large tracts of land have lately been put under beet-root cultivation in Russia; and, under the direction of German agriculturists and chemists acquainted with the growth of sugar-beets and the manufacture of sugar, most satisfactory practical results have been realized in that country of late years. The soil of the sugar-beet-growing farms in Russia is described as very fertile, and the climate of the district well suited for the production of roots rich in sugar. From all I can learn from correspondents settled in Russia, the manufacture of beet-root sugar has probably a great future there. Russia appears to afford a splendid field for the profitable investment of skill and capital in the growth of sugar-beet for the manufacture of sugar and the distillation of spirit.

The recent discovery of immense beds of coprolites and phosphatic rocks, running right through the centre of Russia, is very important; and some day, no doubt, millions of tons of phosphatic minerals, which at present are scarcely utilized at all, will be of the greatest service to the Russian sugar farmer.

The manufacture of beet-root sugar has assumed gigantic proportions in France, Belgium, Germany, and other Continental States, and is still extending in most of them, as will be seen by the following numbers, which give the production of beet-root sugar in the year 1869–70, compared with 1867–8:

	1869–70. Tons.	1867–8. Tons.
France,	240,000	220,000
The Zollverein,	200,000	165,000
Prussia,	90,000	97,500
Belgium,	40,000	32,500
Poland and Sweden,	22,500	15,000
Holland,	12,000	7,500
Austria,	85,000	92,500
	689,500	630,000

It appears from these figures that the beet-root, recent as has been its use in Europe as a source of sugar, contributes more than one-

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quarter of all the sugar known to have been used in the world. The first experiment to produce sugar from beet-root grown in this country was begun three years ago by Mr. Duncan, at his factory at Lavenham, Suffolk. Although the quality of the roots grown in the neighborhood of Lavenham in the two previous years was found to be fully equal in sugar to the average quality of French beets, the experiment did not prove a success in an economical point of view. Mr. Duncan had to deal with inexperienced hands, and to contend with many difficulties inseparable from a new undertaking; but, by perseverance and the exercise of much intelligence, he has overcome these difficulties, and has now satisfied himself that the growth and manufacture of beet-root sugar can be carried on in Suffolk with quite as much success as in the north of France. Great credit is due to Mr. Duncan for having introduced successfully into England a new and profitable agricultural industry, which gives employment to the surplus labor in agricultural districts during the three or four months of the slackest time of the year, and is profitable both to the grower of the roots and to the manufacturer of sugar.

When the experiment was set on foot, three years' ago, to grow sugar-beets in the neighborhood of Lavenham, grave doubts were expressed, in many quarters, whether the climate of England would prove suitable for beet-root culture. The Suffolk sugar-beets, in 1868, it is true, were found to contain, on an average, fully ten per cent of sugar; still, doubts as to the suitability of the climate of England for beet-root culture may be reasonably entertained after one year's experience, for much experience of the quality of English sugar-beets for a number of years is required before we shall know positively whether England possesses natural advantages, or disadvantages, as compared with continental countries, in reference to the production of sugar-beets.

Since the publication of a paper on the chemistry of sugar-beets, in Vol. V, 2d series, part ii, of the *Journal of the Royal Agricultural Society*, in which will be found numerous analyses of beets grown in England in 1868, I have analyzed a good many roots grown in various parts of Great Britain, and have thus had the opportunity of forming a sound opinion of the quality of sugar-beets raised in 1869 and 1870.

A record of the results of these analyses, accompanied by a few remarks likely to be interesting to sugar-beet growers, it is hoped may prove useful at the present time, when the subject of beet-root sugar manufacture and beet-root distilling is attracting so much public attention.

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Composition of Sugar-beets grown in England in 1869.

The following analyses express the composition of sugar-beets which were grown in Berkshire, on a naturally stiff but well cultivated clay soil:

COMPOSITION OF BERKSHIRE BEET-ROOTS.

	Average of Two Roots.			
	No. 1.	No. 2.	No. 3.	No. 4.
Water	81.28	81.71	84.40	85.91
Albuminous compounds*	1.24	.98	.91	.87
Crude fibre (pulp)	4.01	4.02	3.04	3.73
Crystallizable sugar	11.87	12.02	9.14	7.98
Pectin, coloring matter, etc.	.63	.45	.54	.41
Mineral matter (ash)	.97	.82	.97	1.10
	100.00	100.00	100.00	100.00
Specific gravity of juice	1.0698	1.0709	1.0559	1.0507
At a temperature of	71° F.	71° F.	59° F.	59° F.
	lb. oz.	lb. oz.	lbs.	lb.
Weight of roots	1 5	1 12½	2¾	1¾
Weight of second root	1 5	1 1½	.....	.....
* Containing nitrogen	1.99	.157	.145	.129

These four specimens were grown on the same farm, but on different fields.

Nos. 1 and 2, it will be seen, are rich in sugar; No. 3 contains a fair average proportion; and No. 4, although it weighed one pound less than No. 3, contained one per cent less sugar than No. 3, and four per cent less than No. 2. I have not been able to learn under what particular circumstances the several roots were grown. The differences in their quality, no doubt, were due either to variations in the soil, or to the kind and quantity of the manure with which they were grown.

The land upon which sugar-beets are intended to be grown should be thoroughly and deeply cultivated, in order that the roots may readily penetrate into the soil, and not grow out of it, which they will do when they are grown on heavy and badly worked soils.

Deep cultivation, so favorable to all root crops, is absolutely indispensable for the production of beets rich in sugar; for experience has shown that the portion of the root which, in badly worked land, grows out of the soil, is much poorer in sugar than the lower part covered by soil. For this reason it is well to draw the soil around the roots as closely as possible, when the crop is horse or hand hoed. In proof of the fact that the lower part of beet roots grown in the soil is richer in sugar than the top part grown out of it, two analyses of a sugar-

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beet grown in Berkshire may be quoted. The lower part of the root weighed two pounds eight ounces, and the upper and somewhat green colored part weighed five ounces; and an analysis of two separate portions of the root presented the following results:

	Lower part, weighing 2⅝ lbs.	Upper part, weighing 5 oz.
Water,	86.05	87.20
Albuminous compounds,*	.82	2.39
Crude fibre (pulp),	3.08	3.73
Crystallizable sugar,	8.05	4.24
Pectin, coloring matter, etc.,	.89	.40
Mineral matter (ash),	1.11	2.04
	100.00	100.00
*Containing nitrogen	.131	.382
Specific gravity of juice,	1.0585	
At a temperature of	59°F	

The top part thus contained only about one-half the amount of sugar which was found in the lower portion of the same root, and it, moreover, abounded in albuminous compounds and saline mineral matters, constituents which are great impediments to the extraction of crystallizable sugar.

Roots containing only four per cent of sugar, as much as two per cent of saline mineral matter, and about the same quantity of albuminous compounds, are practically useless for the manufacture of sugar. For this reason: the greenish colored top part of beets is cut off in the factory before the roots are reduced to pulp by the rasping machinery.

The proportions of water and sugar in other roots grown in Berkshire, in 1869, were the following:

No.	Per centage of water.	Per centage of sugar.
1,	80.45	11.04
2,	82.74	8.79
3,	81.50	8.63
4,	83.55	8.88
5,	82.92	10.55
6,	83.44	10.32

Composition of sugar-beets grown in 1869, *in Ayrshire, by the Right Hon. T. F. Kennedy, Dalquarrhan Castle, Maybole.*—One root, weighing three and a half pounds, was analyzed separately, and three other roots, weighing respectively four and a half pounds two ounces, four and three-quarters pounds one and a half ounces, and three and a half pounds, were analyzed together as one sample, with the following results:

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COMPOSITION OF AYRSHIRE SUGAR-BEETS IN 1869.

	No. 1.	No. 2.
Water,	89.08	89.17
Albuminous compounds,*	1.94	1.60
Crude fibre (pulp),	2.16	2.19
Crystallizable sugar,	5.04	5.29
Pectin, etc.,	.34	.30
Mineral matter (ash),	1.44	1.45
	100.00	100.00
* Containing nitrogen,	.311	.256
Specific gravity of juice,	1.043	1.045
At a temperature of	58°F	58°F

These roots are very poor in sugar, and hardly better than common mangolds. In 1868 Mr. Kennedy grew beets at Maybole of a much superior character, some containing as much as twelve per cent of sugar. The season of 1869 was not less favorable for the development of sugar in roots than 1868, and hence the poverty of the beets grown by Mr. Kennedy in 1869 must have been due entirely to the mode of culture.

Monster roots, as is well known, are always very watery, poor in sugar, and consequently equally bad for feeding purposes and for the manufacture of sugar. Two such roots, grown in 1869, at Buscot Park, by Mr. Campbell, were sent to me for analysis by that gentleman, together with two species of French beets. The contrast in the quality of these big roots and moderately sized specimens is very striking, as will be seen by the following analyses, which I have grouped together, with an average analysis of fifteen lots of beets grown in 1869 in the neighborhood of Lavenham, in Suffolk:

	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.
Water	83.75	84.08	91.35	91.50	82.46
Crystallizable sugar	10.56	10.98	4.05	3.89	11.06
Albuminous compounds *	.93	.78	1.35	1.04	.81
Pectin and colouring matter	.62	.68	.34	.36	.66
Crude fibre (pulp)	2.98	2.71	1.72	1.90	3.87
Mineral matter (ash)	1.16	.77	1.19	1.31	1.14
	100.00	100.00	100.00	100.00	100.00
Specific gravity of juice	1.0579	1.0646	1.0352	1.0336	1.06218
At a temperature of	58° F.	58° F.	58° F.	58° F.	64° F.
Weight of roots	lbs. 2½	lb. oz. 1 10¼	lbs. 16	lbs. 12¼	
* Containing nitrogen	.149	.125	.216	.167	.129

No. 1. Collette rose (French beet); No. 2, Lanthiez (French beet); Nos. 3 and 4, beets grown at Buscot Park; No. 5, Lavenham beets.

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The beets which were grown in Suffolk, it will be seen, are fully as rich in sugar as the French roots, and in all other respects quite equal to them for the manufacture of sugar.

Well-matured roots, while rich in sugar, contain comparatively little albuminous matter. A high per centage of water, as in the case of the Berkshire beets, is frequently accompanied by a larger amount of albuminous compounds than that in roots containing very much more solid matter.

Indeed, much albuminous matter in roots indicates immaturity and poverty in sugar, a condition characteristic of big, excessively-manured roots.

Beets grown in Ireland in 1869. — Three lots of sugar-beets, of four roots each, grown experimentally at Glasnevin, on analysis were found to have the following composition:

	No. 1.	No. 2.	No. 3.
Water	85.60	85.59	89.09
Albuminous compounds*	1.47	1.66	1.27
Crystallizable sugar	8.56	7.87	6.73
Pectin, etc	.54	.75	.45
Crude fibre	2.87	3.06	2.48
Mineral matter (ash)	.96	1.07	.98
	100.00	100.00	100.00
Specific gravity of juice	1.0505	1.0554	1.0478
At a temperature of	67° F.	60° F.	61° F.
Weight of each root—	lbs. oz.	lbs. oz.	lbs. oz.
No. 1	2 0	1 8	3 6¾
No. 2	2 12	2 0	2 8
No. 3	3 4	2 1	2 2
No. 4	1 12	1 13	2 12
* Containing nitrogen	.286	.267	.204

The beets marked No. 1 were sown in drills on the 13th to the 15th of May, twenty-one inches apart, and six inches in the row; no manure was applied, the previous crop (mangolds) having been manured at the rate of twenty-five tons per statute acre. Estimated produce per acre, 13 tons, 2 cwts., 3 qrs.

No 2, sown 11th and 12th May, in drills twenty-seven inches apart, and six inches in the row. Farm yard manure was applied, at the rate of twenty-five tons per statute acre; previous crop, swedes. Estimated produce per acre, 19 tons, 2 cwts., 3 qrs.

No. 3, sown on the 16th of May, in drills on the flat, twenty-one inches apart, and six in the row. Farm yard manure was applied at the rate of twelve tons per acre. Previous crop oats, followed by rape as a stolen crop. Estimated produce, 10 tons, 5 cwts., 2 qrs. per acre.

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These experiments are interesting, as showing the prejudicial effect of direct application of farm yard manure to sugar-beets, especially if the crop is sown as late as were the roots in the Glasnevin experiments.

The Glasnevin experiments did not give very encouraging results; but it must not be inferred from this that the climate of Ireland is not suitable for sugar-beets, for, in similar experiments made at Glasnevin in 1870, beet-roots were obtained which were much richer in sugar than those grown in the previous season. The comparative poverty of the Glasnevin beets in sugar in 1869 appears to have been mainly due to late sowing and to the application of farm yard manure to two of the lots, in consequence of which the roots did not get fully ripe.

The Hon. Agar Ellis, who takes a great interest in all matters likely to affect the material welfare of Ireland, instituted, both in 1869 and in 1870, experiments on the growth of beet-roots, with a view of ascertaining whether the climate of Ireland is suitable for producing roots sufficiently rich in sugar to be used for the manufacture of sugar.

A number of sugar-beets, grown mostly in the county of Kilkenny, were sent to me for examination by Mr. Agar Ellis. Their composition is given in the table on page 183.

The beets No. 1 were grown on poor light soil, after a crop of ley-oats the previous year, with about thirty tons of farm yard manure and 6 cwts. of Lawes's superphosphate per Irish acre. The weight of sugar-beets upon one square perch, without tops, was 3 cwts.

The beets marked No. 2 were grown at Woodstock Farm, county Kilkenny, and No. 2 at Woodstock Garden. The seed, supplied by the Hon. Agar Ellis, M. P., was sown about the middle of April, in garden ground, trenched four feet deep two years before. The ground stands at about 400 feet altitude. No manure was used except a sprinkling of charred earth, which was put on the ground previous to the seed being sown. The ground was kept clean, and a little earth was forked up to the roots in July. The plants stood in the line from three to six inches from each other. The weight of the crops per imperial acre, taking the average weight of a yard, would be about fifty tons.

No. 3, grown by Mr. Thomas Seigne, Kilfane Farm, Kilkenny.

No. 4, grown by Viscount Clifden, at the gardens, Gowran Castle, 200 feet above the sea-level. The seed was sown on the 20th of April, on very heavy loam, without manure, the land having been regularly manured for many years previous.

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COMPOSITION OF BEET-ROOTS GROWN IN IRELAND IN 1869.

	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.	No. 7.	No. 8.	No. 9.
Water	86.30	87.70	87.78	84.05	88.65	82.79	86.70	86.06	87.12
Albuminous compounds *	.83	1.48	.72	2.32	1.40	1.56	1.56	1 66	1.99
Crude fibre (pulp)	2.98	2.87	2.33	2.79	2.89	3.43	2.99	2.98	2.96
Pectin and coloring matter	.44	.50	.96	.43	.33	.46	.74	.44	.42
Crystallizable sugar	8.26	6.51	7.22	8.94	5.37	10.91	6.79	7.53	6.18
Mineral matter (ash)	1.19	1.44	.99	1.47	1.36	.85	1.22	1.33	1.33
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Specific gravity of juice	1.0527	1.0498	1.0498	1.0507	1.0449	1.0656	1.0529	1.0574	1.0512
At a temperature of	59° F.	67° F.	67° F.	66° F.	67° F.	60° F.	62° F.	61° F.	65° F.
Weight of roots	lbs. oz. 2 12	lbs. oz. 4 1	lbs. 3½	lbs. oz. 3 12	lbs. 4	lbs. 2¼	lbs. oz. 3 12	lbs. 3	lbs. 4
* Containing nitrogen	.132	.237	.116	.372	.225	.25	.251	.267	.319

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The crop was irregular, and produced about forty tons of roots per acre.

No. 5, grown at Gowran Farm.

No. 6, grown by Mr. Thomas Lyster, Dunbell, county Kilkenny, on stiff clay land.

No. 8 shows the composition of an average sample of six carrot-shaped sugar-beets, grown in the county of Kilkenny; and No. 9, that of six pear-shaped beets.

Mr. Lyster's beets, it will be seen, weighed on an average two and a quarter pounds each, and contained, in round numbers, eleven per cent of sugar. Excepting Mr. Lyster's beets, the remainder of the roots grown in the county of Kilkenny, in 1869, contained about seven and a half per cent of sugar on an average.

COMPOSITION OF SUGAR-BEETS GROWN IN 1870, IN ENGLAND AND IRELAND.

The culture of the sugar-beet in England has been largely extended in 1870, by Mr. A. Campbell, at Buscot Park, Berkshire; and by the farmers in the neighborhood of Lavenham, in Suffolk.

In both these localities the sugar-producing qualities of the roots have been most satisfactory. The beets, on an average, were found to contain fully twelve per cent of sugar. Mr. Duncan informs me that he expects, as the result of this season's working, to obtain, from the whole of the roots which were supplied to him in 1870, eight per cent of saleable crystallized sugar of fine quality.

By way of experiment, sugar-beets were grown this season in various parts of England. I have made analyses of beet-roots grown in 1870, in the neighborhood of Wallingford, Berkshire, in two places in Yorkshire, others raised near Sandwich, and also on several farms in the county of Kilkenny, Ireland. I shall now proceed, by briefly reporting on the qualities of these roots.

Composition of sugar-beets grown near Wallingford, Berkshire.—The following analyses were made of average samples of four roots per lot:

The seed for No. 1, white Silesian beets, was supplied by Messrs. Gibbs & Co.; No. 2, red, and No. 3, white Silesian beets, were grown from seed obtained from Douai.

The analyses show that all three lots of Wallingford roots were rich in sugar. There is no great difference, either in the weight of the roots of the several lots, or in their sugar-producing qualities. The climate of a country in which beet-roots can be grown as rich in sugar

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as the Berkshire specimens would appear favorable for the cultivation of that crop.

COMPOSITION OF SUGAR-BEETS GROWN IN 1870, NEAR WALLINGFORD, BERKSHIRE.

	No. 1.	No. 2.	No. 3.
Water	79.23	79.84	80.98
Albuminous compounds *	1.82	1.92	1.55
Crude fibre (pulp)	4.18	4.20	3.20
Pectin, coloring matter, etc.	.45	.54	.47
Crystallizable sugar	13.31	12.51	12.72
Mineral matter (ash)	1.01	.99	1.08
	100.00	100.00	100.00
Specific gravity of juice	1.0759	1.0752	1.0698
At a temperature of	67° F.	70° F.	67° F.
Weight of each root—	lbs. oz.	lbs. oz.	lbs. oz.
No. 1	1 8¼	1 6½	1 8¾
No. 2	1 8½	1 4	1 0¾
No. 3	1 3½	1 3½	1 0
No. 4	15¼	10½	11¾
* Containing nitrogen	.292	.308	.248

COMPOSITION OF SUGAR-BEETS GROWN IN YORKSHIRE AND IN SURREY.

	No. 1.	No. 2.	No. 3.	No. 4.
Water	84.41	80.78	82.29	85.45
Albuminous compounds *	.95	.95	1.23	1.45
Crude fibre (pulp)	2.60	3.65	3.17	2.40
Pectin, etc.	.67	.47	.47	.41
Crystallizable sugar	10.43	13.27	11.76	9.06
Mineral matter (ash)	.94	.88	1.06	1.23
	100.00	100.00	100.00	100.00
Specific gravity of juice	1.0585	1.0677	1.0658	1.0523
At a temperature of	70° F.	60° F.	66° F.	70° F.
Weight of roots—	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.
No. 1	2 15½	1 3½	3 5	6 5
No. 2	.....	1 8	3 4	6 0
No. 3	.....	1 9	2 12	
No. 4	.....	1 10	3 9	
No. 5	.....	0 15	2 11½	
No. 6	.....	0 14¾	2 10	
* Cotaining nitrogen	.152	.152	.198	.232

The beets marked Nos. 1 and 2 were grown in Yorkshire. No. 1 at Bassal, by Mr. Charles Ellershaw; and No. 2 at Myton Hall, Helperley. Both lots are excellent sugar-beets; No. 2 being particularly rich in sugar, and free from an undue proportion of albuminous and saline constituents, which present obstacles to the extraction of crystallizable sugar.

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The roots marked Nos. 3 and 4 were grown near Sandwich, by Sir Walter James.

Of a number of roots sent for examination, I selected two very large ones, weighing, when trimmed to the same extent as they are by manufacturers of beet-root sugar, 6 lbs. 5 oz. and 6 lbs. respectively, and analyzed them together. I fully expected the amount of sugar in these big roots to have been low, but, contrary to my expectation, I found as much as nine per cent of sugar in them. The analysis in column No. 3 was made with a sample of six beets, weighing on an average nearly 3 lbs. per root, and containing 11¾ per cent of crystallizable sugar.

This is a very satisfactory result, showing that good sized roots, of a high sugar-producing quality, can be grown in England, under favorable conditions.

In the next place, I have to report on the quality of sugar-beets grown in 1870 on various farms in the county of Kilkenny, Ireland. The beets were sent to me for examination by the Hon. Agar Ellis, M. P., and the results of their examination are incorporated in the table on page 187.

Nos. 1, 2 and 3 were beet-roots grown by Viscount Clifden, Gowran demesne, on heavy loam, with yellow clay subsoil; ley-oats in 1869, manured for beet in 1870, with 6 cwts. best superphosphate per Irish acre.

No. 4, grown by Mr. Thomas Seigne, Kilfane farm, on heavy clay land resting on limestone bottom; manure 6 cwts. superphosphate per Irish acre. Preceding crops, oat following potatoes.

No. 5, grown by Mr. Thomas Seigne, Coppena farm, on light loam, marly bottom; manure 6 cwts. superphosphate per Irish acre; preceding crop, barley. This farm is situated on a hillside, upward of 600 feet above the level of the sea.

No. 6, grown by Mr. Thomas Lyster, Dunbell, on a stiff clay soil; manures, half farm yard manure and six hundred weight superphosphate per Irish acre.

No. 7, grown by Mr. Thomas Murphy, Coppena.

No. 8, grown at Mount Loftus, on rich loam with farm yard manure.

Nos. 9 and 10, were grown by Mr. Henry Flood, Viewmount.

The preceding analyses were made of fair average samples, of five or six roots, perfectly clean, and having the top part or crown cut off.

The roots grown by Viscount Clifden, are capital sugar beets. Although they weighed from one and one-half to two pounds each, cleaned and trimmed in the same way as by beet-root sugar makers, they nevertheless contained nearly fifteen per cent of sugar.

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COMPOSITION OF SUGAR-BEETS GROWN IN COUNTY KILKENNY, 1870.

	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.	No. 7.	No. 8.	No. 9.	No. 10.
Water	76.58	80.42	79.93	82.10	81.99	83.49	83.96	79.10	77.64	77.88
Albuminous compounds *	2.10	1.11	1.11	.78	1.12	1.43	1.50	2.01	1.75	1.57
Crystallizable sugar	14.81	13.69	13.34	12.42	11.96	10.07	9.89	12.77	14.69	14.78
Pectin and extractive matters	.66	.59	.61	.49	.52	.58	.57	.62	.69	.68
Crude fibre (pulp)	5.01	3.42	4.04	3.34	3.48	3.38	3.10	4.36	4.42	4.30
Mineral matter (ash)	.84	.77	.97	.87	.98	1.05	.98	1.14	.81	.79
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Specific gravity of juice	1.0792	1.0682	1.0698	1.0637	1.0650	1.0596	1.0578	1.0707	1.0761	1.079
At a temperature of	69° F.	66° F.	62° F.	63° F.	61° F.	64° F,	61° F.	63° F.	64° F.	66° F.
Weight of each root—	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.
No. 1	2 0	2 15	2 2	2 0	3 9	2 8¾	3 0	15¾	1 6	1 5½
No. 2	1 13	2 6	2 0	1 12	2 10	2 2½	2 15	12	1 10	1 8
No. 3	1 14	2 13	2 7	1 5	3 10	2 2¾	3 5	1 1	1 7	1 5½
No. 4	1 15	2 12	1 7½	2 2	3 0	1 15	3 10	15¼	1 6	1 15
No. 5	1 1½	2 9	2 5	1 11	3 6	2 3½	3 1½	15½	1 7	2 4½
No. 6	1 11	2 13	.....	1 8	.....	.....	.....	.....	.....	.....
* Containing nitrogen	.337	.178	.178	.126	.179	.23	.241	.326	.28	.252

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It is worthy of special notice, that the beets, No. 5, grown by Mr. Thomas Seigne, contained twelve per cent of sugar in round numbers, although they weighed on an average, about three and one-half pounds each. This shows, that in a favorable season, good sized roots, and yet roots rich in sugar, can be grown in Ireland.

It will be noticed, that of the ten lots of beets, three lots contained nearly fifteen per cent of crystallizable sugar.

Two lots contained thirteen and one-half per cent on an average. Three lots contained from twelve to twelve and three-quarter per cent. Two lots contained about ten per cent on an average.

These results speak for themselves; they show at all events, that excellent sugar beets were grown in Ireland, in 1870. I question much whether better sugar beets were grown in that season, in the most favored beet-root districts of Belgium or France.

The summer and autumn of 1870 were, no doubt, highly conducive to the development of sugar in root crops, and probably the beet-roots which were raised in England and Ireland in 1870 were richer in sugar than they are likely to be in average seasons. Still, considering that we now have three year's recent experience on the cultivation of sugar-beet, there seems to me no good reason why beet-roots should not be profitably cultivated in many parts of the United Kingdom. In a good season, I believe from eighteen to twenty tons of beets, of as good a sugar-producing quality as in France or Belgium, may be grown without difficulty.

The farmer will run very little risk by trying the experiment to grow sugar-beets instead of common mangolds; for if he cannot obtain a good price for his roots from the sugar manufacturer, he can use the beet for cattle food, and although he may not get so heavy a crop as he does when he plants common mangolds, it has to be borne in mind that one ton of sugar-beets, is equivalent in nutritive qualities, as cattle food, to at least one and one-half tons of good common mangolds.

Sugar-beets exhaust the land far less than common mangolds, and as the former should not be grown with farm yard manure, the whole expense of the manure for a crop of beet-roots, will be the cost of three to four hundred weights of superphosphate

Common mangolds, generally, are heavily manured with rotten dung, or with dung and guano, or mixed artifical manure rich in nitrogen. In consequence of the excess of the nitrogenous manures which are usually applied to mangolds, the roots do not get fully ripe by the time frost sets in, and the crop has to be taken up in a more or less immature condition. In this unripe state, mangolds, when given to

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sheep or cattle, not only do them no good, but they act medicinally, causing stock to scour. Hence mangolds have to be stored in pits, and, speaking generally, are not in a fit condition to be consumed either by sheep or cattle before the middle of January. Sugar-beets, on the other hand, come earlier to maturity, and, in fair average seasons, may be consumed as cattle food with advantage as early as October. A few acres of sugar-beet, I cannot help thinking, would supply more solid feeding matter and food of a more nutritious character, than a good many acres of watery and spongy, tasteless and innutritious stubble turnips. It appears a very desirable thing on many farms, to have the command of good autumn or early winter food, and not to consume the mangold or Swede crop too soon, and sugar beets would be useful I believe in bridging over the period when common mangolds cannot be given to stock with safety.

Beet-root distillation.—In connection with the manufacture of sugar, the distillation of spirit is frequently carried on in continental beet-root sugar factories. In France alone there are about 500 beet-root distilleries, and in Belgium and Germany also, the work of distilling spirit is often combined with the manufacture of beet-root sugar. The most profitable return for the molasses produced in refining and crystallizing beet-root sugar, appears to be realized by its conversion into spirit; and hence we find on the continent, attached to many beet-root sugar factories, distilleries in which molasses is thus utilized. The combination of these two branches of industry, moreover, has the advantage, that in seasons when the proportions of sugar in the roots is too poor to yield much profit to the manufacturer, if he extracts the sugar in the beets, he may, with greater profit, utilize the beet crop by fermenting the sliced beets or their sugary juice, and obtain, by distillation, from the fermented materials, the spirit which has been produced by the act of fermentation. Again, when the market price of spirit is high and that of sugar low, it may, even in good seasons, pay better to make spirit instead of sugar from beet-roots, and hence, beet-root distilling is at times vigorously pursued in France, whilst the manufacture of sugar is stopped for a season. Indeed, it is maintained by the advocates of beet root distilleries, that the distillation of spirit is on the whole a more profitable business than the manufacture of beet-root sugar; and in consequence of this opinion prevailing in France, a good many sugar factories in that country have, of late years, been entirely converted into distilleries.

In comparison with the manufacture of beet-root sugar, the operations that have to be carried out in beet-root distilleries are very

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simple. In the first place, the roots are passed through a washing machine and thoroughly cleasned from all adhering earth and dirt. The clean roots are then rasped or cut by proper machinery into thin slices. The pulped or sliced beets have next to be treated according to one of the three following plans:

1. The pulp is mixed with a small quantity of sulphuric acid, and then placed in suitable presses; the expressed pulp is carted away, and constitutes a valuable food for fattening cattle. The juice is run into the fermenting vats of convenient capacity. A number of fermenting vats, generally made of wood, and filled with juice in a more or less advanced state of fermentation, are kept in a separate room, in which a proper and uniform temperature, highly conducive to a steady fermentation of the sugary liquid is maintained. When all the sugar has been transformed into alcohol, and the fermentation been completed, which is seen by the liquid ceasing to give off bubbles of carbonic acid gas, and becoming quiet, the dilute alcoholic liquid or wash is pumped into the stills, and by the simple process of distillation, the alcohol, more or less diluted with water, and contaminated with certain by-products of fermentation, is separated from the larger proportion of the water, which remains in the stills and subsequently is allowed to run to waste as useless. By these simple operations, impure spirit of a certain strength may be obtained by laborers of ordinary intelligence.

2. The sliced beet-roots are subjected to the process of maceration and displacement of the sugary juice by hot wash (Champonois' method). It is essential to success that the slices are neither too thick nor too thin; in the former case, the liquid employed in macerating the sliced beets, which is slightly acidulated with sulphuric acid, does not readily penetrate the cells containing the sugary juice, and a larger quantity of liquid has to be used for the extraction of the juice than is necessary if the slices are of the proper dimensions. In consequence of this excess of acidulated water, which has to be used in order to avoid loss of sugar, the juice obtained under these circumstances becomes too dilute to ferment subsequently with regularity. On the other hand, if the slices are too thin, their texture is broken up too much, and they are apt to form pulpy masses, which can only be imperfectly extracted by the warm macerating liquid. In Champonois' process of maceration the use of presses is avoided, and the sugar contained in the beets passes by displacement into solution. The sugary liquid readily enters into fermentation without the addi-

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tion of yeast. The alcohol contained in the fermented juice or wash is finally obtained by distillation in ordinary stills.

3. According to Leplay's plan, the beets are sliced, and the slices placed in vats and subjected to fermentation, without undergoing any previous treatment. During the fermentation the sugar is converted into alcohol, which remains in the slices, and, on completion of this transforming process, the fermented slices are introduced into stills of a peculiar construction, and the alcohol drawn off by distillation. The residuary slices in the stills, having been subjected to the effects of boiling water, are too much saturated with water and in too pulpy a condition to be carted away for cattle food, with convenience or advantage, to a farm at some distance from the distillery; hence, the cooked slices in the stills, after the extraction of the alcohol, have to be consumed by fattening cattle in the immediate neighborhood of the distillery.

With regard to the comparative merits of the press system and Champonois' plan, or Leplay's system, it may be stated that the opinions of practical distillers in France and Germany are divided. Some advocate one system, others speak in favor of another. The advantages and defects of each of the three systems have been freely discussed by writers on beet-root distilling, without leading to a definite result showing, under all circumstances, a decided superiority of any one plan. Arguments based on purely theoretical considerations may be advanced in favor of any of the three preceding systems; but it appears to me that local conveniences, rather than practical arguments, will decide which of the three plans is the most economical and desirable for adoption in a particular place.

The spirit obtained by simple distillation from the fermented beet-root juice, or the fermented sliced beets, is not saleable, as it is neither sufficiently strong nor pure enough to be employed for the purposes for which alcohol is used. Besides water, the product of the first distillation of the fermented beets contains certain compounds, some of which are more volatile than alcohol, and others less so. All these by-products of the fermentation of the saccharine beet-root juice are more or less unpleasant to the smell and taste. Moreover, several of these impurities in crude spirit are poisonous, and hence great care has to be bestowed upon the separation of these impurities from the alcoholic liquid obtained by the first distillation.

With a view of separating the alcohol from much of the water which is present in the dilute product of the first distillation, and of obtaining the alcohol in a pure condition, the impure spirit has to be

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redistilled in a rectifying still, that is, a distilling apparatus of a peculiar construction. The special object of this rectification is to get rid of the compounds which impart a most disagreeable smell, burning taste and poisonous properties to impure grain or beet-root spirit. These impurities, known under the generic name of grain, potato, or fusil oils, have an oily consistency; hence the name.

They are mixtures of several liquids boiling at a temperature varying from 185° to 270°. Fusil or grain oils, substantially consist of a species of alcohol, which, under the name of amylic alcohol, is described by scientific chemists as a colorless oily liquid, lighter than water, and having a specific gravity of .815. Amylic alcohol has a nasty, burning taste, a disagreeable smell, and is poisonous. It has an analogous constitution to ethyl alcohol, which is but another name for ordinary alcohol, or spirits of wine. Amylic alcohol burns readily on approach of a lighted taper, mixes in all proportions with wine alcohol and ether, but not with water. Shaken up with water, amyl alcohol (fusil oil) rapidly separates and floats on the surface of the water, forming an oily liquid.

The more perfectly fusil oil is removed from alcohol in the act of rectification, the greater is the commercial value of the rectified spirit, apart from its strength, which of course affects the value of alcoholic liquids.

The rectification of crude beet-root spirit, and the production of clean spirit from it, has been much simplified of late years by the introduction of improved rectifying stills, which enable the beet-root distiller at the present time to produce spirit of a degree of purity which contrasts most favorably with the impure beet-root spirit that twelve years ago was made in various localities in England. Beet-root distilleries, it may be in the recollection of some of the readers of this journal, were established about twelve years ago at Birmingham, in the neighborhood of Wallingford, at Minety (Gloucestershire), and in several other localities. After a languid existence of a few years these distilleries had to be closed; and during the short time that they were in operation, they produced a very inferior kind of spirit, that could not be used for any of the purposes for which tolerably pure spirit must be employed. In fact the beet-root spirit that was made at the time was so much impregnated with fusil oil, that it could only be used for the manufacture of varnishes, French polish, and for other preparations for which the strong and impure alcohol, selling at the lowest market price, is as suitable as well rectified and much more expensive spirit.

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Formerly animal charcoal was largely used by rectifiers of crude grain and beet-root spirits. At present the use of charcoal has been entirely superseded by the improved distilling and rectifying apparatus that may be seen in operation in most of the continental distilleries.

Two years ago Mr. Robert Campbell, of Buscot Park, erected a beet-root distillery on an extensive scale on his estate in Berkshire, and is now carrying out, for the second year, an experiment, on a scale which will ultimately result either in a splendid success or a gigantic failure. Mr. Campbell's spirited enterprise will be watched with great interest by the agricultural community. Mr. Campbell, who farms about 5,000 acres of land, expects to grow yearly not less than from 10,000 to 12,000 tons of beet-root for distilling purposes, and to be supplied by his distillery with sufficient refuse pulp to feed 12,000 sheep and 2,500 oxen.

Mr. Campbell, on the strength of the best information obtainable in France and elsewhere, as regards the most efficacious rectifying stills for obtaining pure alcohol, decided in favor of Messrs. Savalle & Co.'s stills. These stills are held in high esteem not only in France, but likewise in Germany, Holland, Belgium and other parts of the continent; and they received a gold medal for excellence and superiority at the International Exhibition in Paris, in 1867. By the use of these stills, Mr. Campbell obtains from beet-root an extremely pure alcohol of great strength, which cannot be distinguished from pure spirit of wine. When I saw the Buscot distillery in active operation in the spring of last year, the pulped beet-root was pressed through Collett's presses, and the juice thus produced was fermented and subsequently distilled.

This season, I am informed, Mr. Campbell has changed his *modus operandi*, and discarded Collett's presses for obtaining the saccharine beet-root juice, and altered his fermenting and distilling machinery so as to adapt it to the macerating and diffusion system. All improved stills are heated by steam, which, on account of its regularity of action and economy, possesses great advantages over the former plan of heating by a naked fire. Savalle's stills include a boiler, a distilling column, separating condenser, cooler, and a special reservoir for the reception of fusil oils, and a steam regulator.

The distilling column consists of a metallic cylinder, fitted in the interior with a number of diaphragms, which are placed one above the other. On leaving the distilling column, the impure alcoholic vapors enter the analyzing condenser, in which their densest constituents are liquefied and thrown back into the distilling column, and

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the more volatile escape. The condenser communicates with the refrigerator, which receives the volatile vapours and rapidly condenses them. The condenser as well as the refrigerator are tubular. The regulator is a novel and ingenious contrivance introduced by Mr. Savalle for maintaining a uniform temperature and pressure, conditions essential for producing a rapid flow of good alcohol. The operation, consequently, is never interrupted by excessive heat, over which there is no control in ordinary stills.

The tank for the collection of the fusil oil is placed below the column; it holds the heavy products of distillation, which are produced during the rectification, and are prevented from becoming mixed with the alcoholic liquid in the boiler. Savalle's rectifying stills are self-regulating, and can be managed by any ordinary intelligent laborer.

Perfectly rectified beet-root spirit is identical with pure spirit of wine, and commands in the open market as high a price as the best grain spirit. It is applicable for the production of perfumes, liqueurs, and all purposes for which alcohol, free from fusil oil and similar by-products of fermentation, is required.

An experience extending over three years has convinced Mr. Duncan that beet-root sugar can be profitably manufactured in England; and as the distillation of spirits from beet-root is acknowledged to be even a more profitable operation than the manufacture of sugar, beet-root distilleries are likely, ere long, to be established in various districts in England favorable to the growth of sugar-beets. There is every prospect that such distilleries, when managed by men of good business habits and capital, and possessing experience and skill, will yield a very profitable return for the capital employed in the undertaking. It may, perhaps, be said that as the attempts which were made some ten or twelve years ago to establish beet-root distilleries in this country, turned out complete failures, the renewal of the attempt to manufacture alcohol from beets is not likely to succeed better than in former years. There are, however, good reasons why beet-root distilleries did not then succeed. During my residence at Cirencester I had the opportunity of becoming intimately acquainted with the operations in a mangold-wurzel distillery, which was established about ten years ago at Minety, a village a few miles from Cirencester. Like all the other mangold distilleries erected at that time, the Minety beet-root distillery, after a few seasons, had to be abandoned as an unprofitable speculation.

The roots which were employed in that distillery, and in other dis-

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tilleries, some ten years ago, were common mangolds, for which the farmers in the neighborhood of the works were paid £1 a ton by the company.

It was, of course, the interest of the farmers who supplied the distillery with mangolds, to grow heavy crops per acre. The mangolds, therefore, were strongly manured with rotten dung, guano, and other artificial manures rich in nitrogenous compounds, and calculated to produce large-sized roots. At that period little information existed in England as regards the conditions of growth that favor the development of sugar in the roots; and the aim of the farmer was to grow as large a crop of mangolds as possible, irrespective of quality. Common mangolds of a moderate size seldom contain more than four and a half to five per cent of sugar, and in large bulbs I have found less than four per cent. The return in spirit, it need hardly be remarked, depends mainly upon the per centage of sugar in the roots employed by the distiller; and, as the roots bought by the manager of the Minety distillery were, for the greater part, large-sized common mangolds, which probably contained not quite four per cent of sugar, the farmer who grew something like twenty-five tons per acre of such mangolds, and got £1 per ton for them, did a good stroke of business, while the distiller lost money by the transaction.

In the next place I would observe, that, in several instances brought under my notice at the time, I found that the persons who had charge of the distilleries were ignorant of the details which have to be observed in order to convert the sugar in the roots completely into alcohol; in other words, want of a proper knowledge to carry on the process of fermentation caused a loss of alcohol.

In the third place, it has to be remarked, that the process of rectification of the crude spirit was very imperfectly carried out by beet-root distillers. The rectifying stills in use ten or twelve years ago rendered it next to impossible to produce pure spirit from beets; and, notwithstanding all the skilled experience of a careful superintendent, the old-fashioned rectifying stills, at the best, produced only a moderately clean spirit, which could not compete with good grain spirit. Most of the beet-root spirit that was made in England at that period had an earthy, burning taste, and an extremely disagreeable smell, which rendered it unfit for all the purposes for which a fairly clean spirit is required. By far the larger proportion of English beet-root spirit, in consequence of its bad qualities, could only be used by makers of varnishes and French polish, and for purposes for which methylated

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spirit is applicable. It had, therefore, to be sold at a price scarcely higher than the low price at which methylated alcohol can be bought.

To sum up, briefly, three distinct causes, each sufficient in itself to lead to disappointment, led to the failures which followed the first introduction of beet-root distilleries in this country some ten or twelve years ago.

1st. The distiller employed common mangolds, instead of beet-roots, or, in other words, he used a raw material yielding on an average only four and a half per cent of sugar, and paid as much per ton as for beets containing on an average from nine to ten per cent of sugar, and yielding, of course, more than double the amount of alcohol.

2d. The processes of fermentation were badly managed in the former beet-root distilleries; and,

3d. A very inferior spirit, which had to be sold at the lowest market price, was produced, owing chiefly to the imperfect construction of the rectifying stills then in use.

Of late years much attention has been bestowed by scientific men upon the theory of rectification, and their labors have borne good fruit in the improved apparatus, such as Coffee's or Savalle's stills, for obtaining pure spirit with comparative ease and certainty.

The latter stills have been satisfactorily tested by the success which Mr. Campbell has obtained with them at his distillery at Buscot, in Berkshire.

Beet-root distillation, as has been remarked already, in comparison with the manufacture of sugar, is a simple, and, I may add, a less expensive operation.

The machinery required for the manufacture of beet-root sugar is more expensive than the stills and other implements required in a beet-root distillery. The buildings of a distillery, moreover, can be erected at a less expense than those which have to be put up in a sugar factory.

There is another advantage in growing beet-roots for the use of the distiller, to which I must briefly allude. Experience on a large scale has proved that sugar cannot be profitably manufactured from beet-roots unless they contain at least eight per cent of sugar. Now, it may happen, and even on the Continent it does occasionally happen, that in bad seasons the per centage of sugar in the roots is too low to be profitably extracted. In such bad seasons the sugar factory would have either to stand idle or to work at a loss, were it not for the fact that beet-roots may be used profitably for distillery purposes, if they are comparatively poor in sugar; for it has been found that roots con-

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taining not more than five and a half per cent of sugar will yield a fair profit when they are employed for the production of spirit. In bad seasons the whole of the crop may thus be profitably employed by manufacturers of sugar who combine with their occupation that of distillers. It is further worthy of notice that albuminous compounds or saline matters in beets, which so greatly impede the manufacture of crystallized sugar, exercise no injurious influence upon the production of spirit. Hence, the distiller can make spirit from molasses or from impure saccharine materials, from which sugar cannot be produced. It matters little to him if the sugar in beet-roots is associated with such an amount of saline matter or albumen which would sorely try the patience of the sugar manufacturer and materially affect his profits.

When roots are grown with much manure they are generally richer in saline and albuminous compounds than roots raised upon comparatively poor and unmanured soils. In a country where rents are high it appears to me more profitable to employ manure, and to produce rather a heavy crop of beets of fair average quality, than to abstain from its use and to grow a small crop rich in sugar. If the sole object for which the beets are grown is to produce sugar from them, it is, of course, to the interest of the manufacturer of sugar to be supplied by the neighboring farmers with roots grown on unmanured land, as rich in sugar and as free from albuminous and saline compounds as they can be grown. Roots of that description do not as a rule yield a heavy crop per acre, and hence it may not pay the farmer as well to grow a small crop of superior sugar-producing quality, as it will pay him to grow a heavy crop of not quite so good a quality. The distiller of beet-root spirit can afford to give a better price for inferior roots than the manufacturer of sugar, because the impurities of beets of an inferior quality do not interfere with the production of alcohol, whereas they are highly objectionable to the sugar manufacturer, inasmuch as they greatly reduce the amount of crystallized sugar which can be extracted from the roots. The interests of the farmer and distiller are therefore in harmony to a greater extent than are the interests of the farmer and the manufacturer of sugar.

Mr. Campbell, for the two last seasons, has been carrying out on a large scale, the experiment to grow sugar beets and to convert the crop entirely into spirit and cattle food. In a few years, when no doubt other distilleries will have been established in other parts of the country, we shall be able to form a more correct estimate of the profit that may be derived from beet-root distillation than we can at present.

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In the absence of accurate data, it is vain to calculate what the profits are likely to be, and I therefore abstain from giving currency to the statements which have been put forward in order to show the extremely profitable character of beet-root distillation. With a view of giving persons interested in beet-root distillation some idea of the probable cost of establishing a beet-root distillery, I may observe that the produce of 500 to 600 acres requires the following machinery, which, according to Mr Savalle's catalogue, costs in round numbers £10,000:

2 steam generators of 90-horse power	£880
1 steam engine of 20-horse power	300
1 steam engine of 8-horse power	104
1 steam engine of 1 horse power	72
1 washing machine	48
2 rasping machines	164
6 presses	960
5 pumps	280
2 strainers	24
1 mixer	28
6 fermenting vats	143
1 reservoir	170
Savalle's stills (in iron and copper)	3,350
Pipes and cocks	512
	£7,035
Building, carriage, erection of machinery, &c.	2,965
	£10,000

The actual success and rapid development of beet-root industry on the Continent, and the satisfactory experiments on the growth of sugar-beets which have been made in England during the last three years, in all probability will lead to a considerable breadth of land being applied to the production of sugar-beets. Sugar factories and beet-root distilleries, in addition to the two establishments already in existence, are likely to spring up in localities favorable to the growth of the sugar-beet.

The question may be asked, is it more profitable to manufacture sugar or to distill spirit from beet-roots? It is said that the distillation of spirit has been found the more profitable operation of the two; and probably this is the case when the market-price of spirit is high and that of sugar low, or as long as the distillation of beet-root spirit, in comparison with the manufacture of sugar, is carried on on a limited scale. But should the cultivation of sugar-beets in this country

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increase at a similar rate to what it has on the Continent, the probability is that both branches of beet-root industry will grow together.

In many continental beet-root sugar factories arrangements exist for converting the molasses resulting from refining crude sugar into spirit, and, if desirable, the bulk of the beet-crop can be used in the same establishment either for the manufacture of sugar or for the distillation of spirit.

The manufacture of sugar, or of spirit, in favorable seasons, yields a very good return for the capital employed in either industry; and there can be little doubt that it will pay a farmer very well to sell his beets, if he can grow something like eighteen tons per acre, and get for them, at the works, £1 a ton. The profit to the farmer appears great, if he can dispose of a crop of eighteen tons of roots at that rate; but, at the same time, it has to be borne in mind that he has to deliver the beet at the factory free of cost. The cartage from the farm to the factory, on an average, cannot be less than 5s. per ton-leaving 15s. per ton. Large as the profit appears to be, when he can succeed in raising eighteen or twenty tons of beet per acre, it may yet be questioned whether he turns his produce to the most profitable account if he sells it to the sugar manufacturer and buys back from him the expressed pulp. If, like many a continental beet-grower, the farmer has not sufficient capital or facilities to fatten beasts, or no good market to dispose profitably of his fat stock, it will, no doubt, answer his purpose very well to sell his beets at 15s. per ton net. But let us suppose that he finds it profitable to send to market annually a considerable number of fat animals, and, further, that he is obliged to buy oil-cake, Indian corn, or similar food, in addition to the roots, straw, and grass crops he raises on the farm for home consumption; it then becomes a question whether he would not find it more profitable to give the roots to his stock than to sell them to the sugar manufacturer.

Silesian sugar-beets, of fair average quality, grown in England, on an average contain:

Water,	84.5
Albuminous compounds,*	1.5
Sugar,	9.5
Crude fiber,	3.5
Mineral matter (ash),	1.0
	100.0

* Containing nitrogen, .24.

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Now, as 100 pounds or tons of raw beets contain 15½ lbs. or tons of the perfectly dry matter of which beet consists, it will take about 6½ tons of raw beets to produce one ton of the perfectly dry substance. The dry substance, according to the preceding average analysis, has the following composition:

100 parts contain,

Sugar,	61.29
Albuminous compounds,*	9.68
Crude fiber,	22.58
Mineral matter,	6 45
	100.00

* Containing nitrogen, 1.55.

It will be conceded by every one who gives a moment's consideration to the subject, that this is a very fattening food.

If a farmer sells 6½ tons of raw beets, and obtains 15s. per ton, he obtains £4.17s.6d., and disposes of one ton of perfectly dry feeding matter, containing, as the preceding analysis shows, as much as 61.29 per cent of pure sugar, in addition to flesh-forming matters, readily digested fibre and bone and blood-forming mineral constituents. Now, what description of food, approaching in composition to the dry substance of beet, it may be asked, can be bought at £4.17s.6d. a ton? The answer to this question is conclusive. There is no kind of food at all approaching, in nutritive and fattening qualities, the solid substance of beets, of which one ton can be laid down at the farmer's door, at anything like the price at which he sells one ton of the dry feeding matter of beets to the sugar manufacturer. On farms, therefore, on which not sufficient food can be raised to meet the requirements of the fattening stock, and where considerable sums of money are spent in the purchase of oil-cake, meal and other dry food, it would be folly on the part of the farmer to sell beets at £1 a ton, and to pay the cost of cartage to the factory, which cannot be less than 5s. per ton, on an average.

Beet-root sugar manufacturers or distillers in Continental States, where no ready and profitable sale for fat stock exists, will have, it strikes me, far less difficulty to induce farmers to grow the beets required to keep the factory at full work than in many parts of England, where farmers find it profitable not only to consume the food raised on the farm, but to buy additional food for the fattening stock, and where always a much better price can be realized for well-fattened meat than on the Continent.

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ON STRAW-CHAFF.

By Samuel Jonas.

(From the Journal of the Royal Agricultural Society of England.)

To H. M. Jenkins, Esq.:

Dear Sir.—The following note is written in compliance with your request from the Journal Committee that I would furnish them with my opinion of the value of straw-chaff for feeding purposes, and the best manner of preserving the same:

I had for many years been a great advocate for the consumption of a large portion of straw-chaff for feeding purposes before we had the advantage of the scientific aid of such a man as Professor Voelcker, who, in volume XXI of our Journal, furnishes us with an analytical statement of the materials contained in the straw of our cereal crops, which is highly valuable and satisfactory.

Some years ago our chaff was cut by hand, and used fresh from the knife without the least fermentation, and was consequently little used by us, or appreciated by our cattle and sheep. Since then a plan has gradually been adopted in this locality of cutting and storing chaff in a large mass, and using it when from six to twelve months old. It is, if well managed, thus rendered, by fermentation, as sweet as well-made hay, and eaten by our flocks with great avidity. It has in two seasons, with no turnips, enabled me to winter my sheep and fold the land, leaving sufficient folding to produce a good crop of barley, not from the chaff alone, but from its being the means by which I enabled my sheep to consume with it large quantities of bran, malt culms and oil cake, sufficient to keep them in health and good condition, and to leave the land in a good state for the following crop of barley, which I could not have done by any other means. The turnips were such a complete failure that the same two winters all my fat cattle were fed without having a root to eat. I had two coppers hung in the mixing house, ground my corn, and broke my cake with an American mill. These were mixed together with malt culms and boiled, and after a certain time were emptied boiling hot into a prepared bed of my old straw-chaff. These were stirred over and mixed well together, and used for the stock in a warm state. They did well so fed, and became good fat bullocks, and paid for the expense of food and attendance, which they very seldom do. One of my sons has carried out this plan by fattening sheep in a yard well littered with wheat straw (which is better than barley straw for their feet), and feeding them entirely with boiled food and straw-chaff, no roots. These sheep paid very well for their food. Myself and sons have

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carried out this system of storing old chaff to such an extent that we are using on our occupation (which consists of 4,200 acres of arable land) seven barns, which were previously used for storing corn. My plan of cutting and storing is as follows: I use a twelve horse power engine by Hornsby, which enables me (when used on home premises) to thresh, dress and sack the corn ready for market, and cut the straw into chaff. I use one of Maynard's powerful chaff cutters, which sifts and puts the chaff into bags, ready for being carried into the chaff house. The straw, when delivered from the threshing machine, is carried, by rollers, to the height of nine feet. It then comes down an inclined plane. Three men get in the straw and hand it to the chaff cutter. It is then cut and carried into the chaff barn, and well trodden down, mixing about a bushel of salt to every ton, and also a certain quantity of green stuff. Tares or rye cut green into chaff are sown by hand as the chaff is brought in. This causes it to heat, and, adding the amount of green stuff required to give it a proper heat, is the secret of the successful operation of storing chaff.

Respecting the quantity of green chaff to be mixed with straw chaff to cause a proper fermentation, I use about 1 cwt. to the ton of straw chaff, and one bushel of salt to the ton of chaff. But some judgment is required as to the state of the green stuff. If it is green rye on the ear, a full cwt. is required. If very green tares, a rather less quantity will do. As to the degree of fermentation depends upon the quantity of sap contained in it. This is done in spring and summer. The chaff is not used till October and the winter months. I can thus thresh and dress the corn crops and cut the straw into chaff in one process, the expense of cutting and storing the same being about 1s. per acre. The principal additional expense is for about 4 cwt. of coal per day, and we thresh and cut from eight to ten acres per day.

I am not stating that straw-chaff can be rendered as valuable as hay-chaff for feeding purposes, but that it may, by judicious management, be made a very important auxiliary to the production of meat food for our fast-increasing population. I agree with Professor Voelcker, that the straw used for chaff should be wheat and oat, for these may be cut without loss in a far greener state than is generally done; but barley, to be of good quality, cannot fairly be cut too ripe

Yours faithfully,

SAMUEL JONAS.

Chrishall Grange, Saffron Walden, *November 6th.*

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ON THE BEST MODE OF PREPARING STRAW-CHAFF FOR FEEDING PURPOSES.

By Dr. AUGUSTUS VOELCKER, F. R. S.

(From the Journal of the Royal Agricultural Society of England, part I, 1871.)

In volume VI, part 1, 1870, of this Journal, Mr. Samuel Jonas, of Chrishall Grange, Saffron Walden, gave an interesting account of a plan of preparing straw-chaff for feeding purposes, and preserving it for winter use, which he found extremely useful in practice.

The peculiarity of Mr. Jonas' plan consists in the use of a small quantity of green rye or green tares as a fermenting agent.

Mr. Jonas, who for many years has been a great advocate for the consumption of a large portion of straw chaff for feeding purposes, uses a twelve horse power engine by Hornsby, for threshing, dressing and bagging the corn ready for market, and cutting the straw into chaff at the same time. With a ton of straw-chaff he uses about one hundred weight of rye or tares, cut green into chaff, and one bushel of common salt. This is done in spring and summer; the chaff is not used until October, or the winter months.

The addition of the green stuff causes the straw-chaff mixture to heat; the volatile and odoriferous principles produced by the fermentation are retained by the straw-chaff, itself undergoing a kind of slow cooking process, and they impregnate the whole mass with an extremely pleasant flavor, scarcely inferior to that which characterizes well made meadow-hay.

It appeared to me interesting if not useful to compare the nutritive properties of straw-chaff, prepared according to Mr. Jonas' plan, with ordinary wheat straw, and I therefore made a careful analysis of a sample of chaff taken from the bulk at Chrishall Grange, and kindly supplied to me by Mr. Jonas.

The following results were obtained in the analysis of this straw-chaff:

Moisture	7.76
Oil and fatty matter	1.60
Albuminous compounds (flesh-forming matters)*	4.19
Sugar, gum and other organic compounds soluble in water	10.16
Digestible fibre	35.74
Woody fibre (cellulose)	34.54
Insoluble mineral matter (chiefly silica)	3.20
Saline mineral matters (chiefly common salt)	2.81
	100.00

* Containing nitrogen, .67.

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In explanation of the term woody fibre (cellulose) in the preceding analysis, I would observe that it applies to that portion of the straw-chaff which remains behind after successively boiling the material with water, dilute sulphuric acid and dilute caustic potash solution, and exhausting the residual dried substance with alcohol and ether. There can be no doubt that the different alkaline and acid secretions in the animal organism exercise similar, probably even more energetic effects upon straw than these successive exhaustions with various chemical agents in the laboratory. The treatment with dilute acid and alkali, therefore, affords a better insight into the digestibility of the bulk of straw than the mere exhaustion with water. Let us now compare the preceding analytical results with the composition of ordinary wheat chaff.

The following is the composition of a sample of well harvested wheat straw, which was neither under nor over ripe:

Moisture	13.33
Oil and fatty matter	1.74
Albuminous compounds (flesh-forming matters)*	2.93
Sugar, gum and other organic compounds soluble in water	4.26
Digestible fibre	19.40
Woody fibre (cellulose)	54.13
Insoluble mineral matter (chiefly silica)	3.08
Saline soluble mineral substances	1.13
	100.00

* Containing nitrogen, .47.

A comparison of the composition of ordinary good wheat straw with that of straw-chaff prepared by the system pursued by Mr. Jonas, brings out several points of interest, on which a few observations deserve to be made.

1. In the first place it may be remarked that both kinds of straw-chaff contain about the same proportion of oil. The oil exhausted from straw by means of ether has a bright yellow color, is sweet to the taste and renders straw more palatable and more nutritious than it would be without this constituent. It is appreciable in quantity, for according to the preceding data, one ton of straw chaff contains about thirty-nine pounds of oil.

2. It will be seen that fermented straw-chaff contains rather more than four per cent of albuminous or flesh forming compounds, whereas ordinary wheat straw contains in round numbers only three per cent. The prepared wheat chaff, therefore, is one-fourth richer in materials which produce the substance of the lean fibre of meat, or the muscle.

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3. Common wheat-straw, of good quality, contains about four and a half per cent of sugar, gum, and similar soluble organic compounds. In over-ripe straw the amount of these soluble matters is less. On the other hand, in the sample of fermented straw-chaff analyzed by me, the per centage of sugar, gum, etc., amounted to 10.16, or to nearly two and a half times the amount which occurs in good, unprepared wheat-straw. The much larger proportion of sugar and other soluble matters in the fermented straw, no doubt, is due to the green stuff employed in its preparation; but, at the same time, the process of heating the mixture, it is quite probable, may have had the effect of rendering the chaff more soluble in water.

Bearing in mind that the chaff prepared by Mr. Jonas contains so large a proportion of succulent matter, it is no wonder that cattle and sheep are fond of it, and thrive upon it in a much higher degree than upon ordinary wheat-straw.

4. A comparison of the relative proportions of digestible and of woody fibre in fermented wheat-chaff, with their proportions in common wheat-straw, exhibits striking differences, which cannot fail to arrest the attention of stock-feeders.

Taking together digestible and woody fibre, we have, in the fermented straw-chaff, 70.38 per cent, and in ordinary wheat-straw 73.53 per cent; showing a slight difference in favor of the fermented chaff, which, being richer in sugar and other matters soluble in water, contains about three per cent less vegetable fibre than common wheat-straw.

When the vegetable fibre of each kind of straw-chaff, or the material insoluble in cold and boiling water, is treated with dilute acids and alkalies of the same strength, for the same length of time, and in all other respects precisely alike, a certain proportion of the vegetable fibre is rendered soluble. This soluble portion figures in the preceding analysis as digestible fibre; whilst the matter insoluble after treatment with the various chemical agents, is termed indigestible or woody fibre (cellulose).

Although it is not meant to convey, by those terms, the idea that animals have the power of resolving crude vegetable fibre into digestible and into woody fibre, in precisely the same ratio in which we can separate them in the laboratory, a tolerably good opinion may be formed of the relative digestibility of various foods consisting principally of vegetable fibre, by submitting them to the process usually employed in laboratories for the determination of woody fibre.

In the cases before us, it will be seen that, of the total amount of

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vegetable fibre present in the fermented wheat-chaff, thirty-five and three-quarters per cent were rendered soluble by the treatment prescribed, and thirty-four and a half per cent (in round numbers) left behind as indigestible woody fibre, whilst the seventy-three and a half per cent of vegetable fibre present in common wheat-straw chaff were resolved, by treatment with dilute acid and alkaline liquid, into nineteen and a half per cent only of digestible, and into fifty-four per cent of indigestible woody fibre. In other words, the same treatment rendered soluble 50.85 per cent of the vegetable fibre of the fermented prepared chaff, and only 26.38 per cent of the fibre of common wheat straw.

These differences are very marked, and well-calculated to explain, in a great measure, the great superiority of the fermented chaff as a feeding material over common straw-chaff.

The fermentation to which the straw is submitted in Mr. Jonas' plan, thus has the effect of rendering the hard and dry substance which constitutes the bulk of straw more soluble and digestible than it is in its natural condition. But, useful as the effect of the slow and moist heat, developed in the mixture of straw-chaff with green rye or cut tares, no doubt is in rendering the fibre of the chaff more digestible, this is not the only recommendation of Mr. Jonas' admirable plan of preparing a really very nutritive and important food for stock.

Another recommendation is, the extremely delicate flavor and the palatable condition which is conferred upon the straw in the process of fermentation. The prepared straw-chaff kindly sent to me by Mr. Jonas had all the agreeable smell which characterizes good green meadow-hay, and a hot infusion with water produced a liquid which could hardly be distinguished from hay tea.

Although fermented chaff resembles hay so much in taste and smell, it need hardly be stated that the latter is more valuable for feeding purposes. However, the difference in the nutritive properties of meadow-hay and straw-chaff made from rather under-ripe wheat-straw prepared and fermented in accordance with Mr. Jonas' directions is not so great as might be imagined by some. A little cake, ground into meal and sprinkled over the chaff, would go far to obliterate the difference in the feeding quality of the two kinds of chaff.

I would particularly recommend for that purpose a cake rich in albuminous compounds. Green German rape-cake, or decorticated cotton-cake, added to the straw-chaff in but small quantities, will bring up the per centage of albuminous compounds to what it is in

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good meadow-hay. Best decorticated cotton-cake contains about forty per cent, green rape-cake about thirty-three per cent, and the finest linseed-cake from thirty to thirty-two per cent, of albuminous compounds. About 2 cwts. of decorticated cotton-cake, ground into meal and added to one ton of fermented straw-chaff, presuming it to have always the same composition as the sample analyzed by me, I find constitutes a mixture which agrees closely in composition with good meadow-hay.

In order to enable others to compound a mixed food from straw-chaff, resembling in composition good meadow-hay, I have placed, in the following table, the analyses of ordinary wheat-straw, of the fermented sample, and the mean results of twenty-five analyses of common meadow-hay:

	Compositions of		
	Common meadow hay.	Fermented and prepared straw chaff.	Wheat-straw chaff.
Moisture	14.61	7.76	13.33
Oil and fatty matter	2.56	1.60	1.74
Albuminous compounds (flesh-forming matters)*	8.44	4.19	2.93
Sugar gum and other soluble organic compounds	41.07	10.16	4.26
Digestible fibre	.....	35.74	19.40
Indigestible woody fibre (cellulose)	27.16	34.54	54.13
Mineral matter (ash)	6.16	6.01	4.21
	100.00	100.00	100.00
* Containing nitrogen	1.35	.67	.47

Meadow-hay, it will be seen, contains rather more than twice as much albuminous or flesh-forming matter as the sample of straw-chaff of which the analysis is here given; hence the advisability to add to the latter some oil-cake, which, moreover, will have the effect of raising the per centage of oil, and bringing it up to about the same amount as is found in meadow-hay.

Chaff, especially if made from over-ripe straw, is not much liked by sheep and cattle, on account of its insipid taste and harshness; and considerable difficulty is experienced to induce stock to consume straw-chaff in as large a quantity as is desirable. To meet this difficulty, several stock-feeders with whom I am acquainted have found it useful in practice to use straw-chaff with some treacle previously diluted with sufficient water to impregnate uniformly the chaff with the sweet liquid. The only fault I have to find with this otherwise good plan of rendering chaff more palatable is, that the farmer has to pay from £13 to £14 per ton for the treacle, and obtains in that material

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only about fifty-four to sixty per cent of sugar, the rest being water and impurities of no feeding value.

By Mr. Jonas' plan, straw-chaff is not merely made more palatable, but, as it is mixed with a little green food, it undergoes a slow cooking process, and becomes more digestible and permeated by a delicate hay flavor. Thus the most is made, both of the green stuff and the straw, and an excellent food is provided, at a trifling expense, greatly superior in feeding properties to treacled ordinary straw-chaff, which costs more money.

The great simplicity of preparing and storing straw-chaff, and the inexpensiveness of Mr. Jonas' plan, are further advantages, which all who consume much straw for feeding purposes may secure to themselves.

The more one looks into this subject, the more one becomes impressed with the great practical value of Mr. Jonas' plan of preparing a most useful and nutritious auxiliary food; and it is much to be desired that this extremely simple, inexpensive, and, in all respects, excellent plan of dealing with straw for feeding purposes, may be spread throughout the length and breadth of the country.

11 *Salisbury square, Fleet street, January*, 1871.

ON RECENT IMPROVEMENTS IN THE CULTIVATION AND MANAGEMENT OF HOPS.*

By CHARLES WHITEHEAD.

INTRODUCTION.

Varium et mutabile semper is peculiarly applicable to the hop, for no plant is more fickle, or so difficult to manage. Rustics have a clumsy joke upon its ever-changing nature, saying that it is rightly named "hop," for it *hops* from one extreme to another with wonderful celerity. It is especially sensitive to changes of temperature, so that, at certain stages of its growth, a white frost, or any sudden atmospheric change, may check its vigor, and, by producing abnormal action, render it liable to blight, mould, and other numerous ills which it is heir to. These characteristics of the plant formerly rendered it such an attractive subject for betting, the collection of the hop duty then affording convenient data for the operation, that members of Tattersall's even condescended to put their money upon hops; and

* From the Journal of the Royal Agricultural Society of England, 1870.

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merchants, factors, growers, with many others more or less connected with hops, made their annual venture upon the amount of the duty. It is very interesting, giving besides a forcible illustration of the uncertain nature of the plant, to trace the changes and chances of the crop from June to September, as clearly evidenced by the fluctuations in the betting "sets," or estimates. For example, in the year 1840 the duty was estimated, in June, at from £140,000 to £160,000; on the 14th of July at from £90,000 to £100,000; on the 24th of the same month at £40,000; and it paid only about £34,000 in duty. Again, in the year 1834, the duty was set in July at from £80,000 to £90,000; and it paid over £180,000. Blights and other causes of failure in the hop crop were not looked upon as unmitigated calamities while the duties upon foreign hops were in force. The high prices obtained for the few hops grown frequently proved more remunerative than low prices for a larger crop; and a stimulus was imparted to the trade for a year or two after a partial failure. This natural result of a practical monopoly probably tended to make growers of hops somewhat apathetic and careless about improvements in cultivation and management, and in devising means to make the chances of a crop more certain. Until the last ten or fifteen years quality was not much considered; color was not thought an essential;* nor was the sort of hop much regarded by the brewers. The mighty thirst for pale ale has changed all this, and hop-growers find that color and quality are indispensable; that, if they cannot produce hops to meet these requirements, there are innumerable foreign producers who are vigorously competing with them under more favorable conditions. The Bavarian, French, and Belgian hop-growers have the advantages of climate, of a plantation in the full vigor of youth, of comparatively low rents and taxes, with cheap labor. The American grower, whose acreage is immense, whose improvement in cultivation and management have been very great, have thousands of square miles of virgin soil in which hops will do well for years without manure, a more equable summer temperature, and a proverbial commercial energy. The New Zealanders, in the garden of the world, are making efforts to be represented in the "Borough," *absit omen!* and the Tasmanians boast that their somewhat despised country will some day be the great hop-growing centre of the universe. The rents of hop-land in England have been put up generally, local taxation has nearly doubled, and home competition is greater; for the repeal of the home duty had the effect of

* Mr. Boys, in his "General View of the Agriculture of the County of Kent," in 1805, remarks, that "those late picked hops, though of a *bad color*, are often very strong, and the most experienced planters are of opinion that it is better to be too late than too early in the picking."

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increasing the home hop acreage in a wonderful degree, as in 1861, the last year in which the hop duty was levied, there were only 47,941 acres in full plant in the United Kingdom, whereas the agricultural returns for Great Britain showed 56,562 acres in 1866, and 64,273 acres for the year 1867. The abolition of the customs' duties also stimulated the production of foreign hops to a certain extent. The enormous prices obtained for good foreign hops in 1860 and 1861, on account of the almost utter failure of the English crop in the disastrous season of 1860, tended far more to encourage the foreign growers. The unusual and accidental circumstance of a succession of small and indifferently grown crops in this country for the following seven years, taking the average, has given a general impetus to foreign hop-growing, which has now probably culminated in the extraordinary importation of 322,515 cwts. during the year 1869. This combination of causes has awakened the English growers from lethargy, and has opened their eyes to the real position of affairs; and they are now generally making vigorous efforts to improve their system of cultivation and management, so that it may be said that in no previous decade in the history of hop-growing has such intelligent attention been paid to both the scientific and practical phases of the question as in the years from 1860 to 1870. This is shown by the greatly increased number of well-managed first-class samples to be seen upon the boards of the factors in the Borough, by the various experiments that have been made to stay the ruinous devastations of blight, mould, red spider and other hop pests and diseases, by the introduction of early and improved sorts, and by a more systematized and judicious course of grubbing and planting.

It is proposed to give a concise history of these improvements in cultivation and management within the last few years, by which it will be seen that, although they are considerable, there is yet a great deal to be done in this direction, if the English planters wish to beat the foreign producers, in spite of their many advantages.

IMPROVEMENTS IN CULTIVATION.

General Management.—There was a great ceremony observed formerly in preparing land to be planted with hops. Pasture land was usually preferred, for some unknown reason, and ploughed up by ten horses from twelve to sixteen inches deep. Other land was trenched by workmen, the sticky subsoil thrown on the top, and the good surface mould buried underneath. This made the surface soil unkindly for years, and the delicate "fibres," which are even of more

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importance as food-providers to the plant than the large roots, were sadly hindered in their operations. Land intended for hops is now ploughed in the ordinary way, or rather deeper; the subsoil plough following in the furrow, where subsoiling is possible or requisite. The turf of old pasture land is, or ought to be, pared and burned, in order that the larvæ of the numerous destructive insects may be destroyed; of these, the larvæ of the "ghost" moth (*Hepialus Humuli*), of the small "swift" moth (*Hepialus Lupulinus*), and of the wireworm (*Hemirhipus lineatus*), are most injurious to young hops. The latter larva was ignorantly mistaken for the centipede (*Scolopendra*), whose natural habitation is in decaying fibres; and it is only comparatively recently that the ravages of the wireworm have been duly estimated, and checked by traps of pieces of potatoes, turnips, or rape cake, put into each "hill,"* and regularly watched.

With regard to the actual planting, the custom of cramming as many plants as possible into an acre is exploded. It is thought desirable that there should be at least six feet six inches between every hill, which would give about 1,030 hills to the acre, if planted on the square, and about 1,200, if planted triangularly. A thousand hills are quite enough for an acre; quite as large crops are grown with such a plant as from one of 1,200, or even 1,400 hills, which it was once thought wise to adopt. It is obvious, in the adoption of the system of the less number of hills to the acre, that there is at once a great saving of labor and of expense for poles, and, what is of more importance still, the sun and the air permeate more freely through the alleys.

Two good "sets," or cuttings, that have been one year in a nursery, are usually put to form a hill. Even one very good set occasionally suffices; and it has been observed that the fewer the sets the better the stock or centre hereafter, and not so liable to decay or rot away *in partibus*, especially in "Goldings." The careless practice of planting cut sets taken directly from the hill is fast going out.† Four, or even five, of these were formerly crowded together to form the nucleus,‡ and it frequently happened that, in very dry seasons, they failed to grow, while the bedded or nursery sets rarely fail. Very great care

* "Hill" is the technical term for each plant centre. So called from the custom of earthing, or putting earth on such centres for preservation, &c., during the winter, which thus forms a little mound or "hill."

† The Americans still plant two or three cut sets in this way; but their land is rich, unexhausted, and cheap, so that they do not care about the duration of their grounds.

‡ Mr. Rutley, in his Prize Essay upon Hops, in the Royal Agricultural Journal for December, 1848, says: "The cheapest and best way is to plant cut sets where they are to remain. Five cut sets is a sufficient number to raise a hill, and what is most generally planted."

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and pains are now taken with these sets, to keep varieties distinct, to select the most true and strong, to have their nursery well manured and cultivated. Until lately they were put into any corner of the farm all together, "Colegates" and "Goldings," "Grapes" and "Jones'," forgotten probably until they were required. Moreover, some planters actually used to plant up the dead hills in their grounds with any sorts they happened to have; thus Goldings, the best sort, were filled up with Colegates, the worst sort; and Grapes were jumbled up with Jones' in the most haphazard manner. From time immemorial certain plantations were filled up or renewed with scions taken solely from their own stock, cut from the hill and put directly in, to preserve the supposed superiority of quality, and to hand it down in unsullied line. The cuttings from traditionally celebrated grounds were hoarded as carefully as Dutch tulip bulbs, and planters had jealous fears lest their neighbors should obtain even a rootlet from their "old ground." The consequences of this are plainly evinced by the greatly diminished productiveness of these grounds, their greater tendency to decay at the root, and their predisposition to blight and mould. It is admitted readily that the quality of their fruit is very fine, but this does not by any means counterbalance the disadvantages above mentioned. It is as wrong to propagate plants from the same stocks perpetually, as to breed animals "in and in" without a change of blood. Great delicacy of constitution and diminished fertility are the known result of the inbreeding of animals of all kinds. In each successive generation the evil consequences are increased, in the case of animals as well as of plants, and there is a natural process of selection to degeneracy, as well as for the development of desired and useful qualities.

With regard to new hop-grounds, planters in the Mid and East Kent, and the Farnham districts, are now, as a rule, planting only the very best sorts, such as Goldings and Golding Grapes, Whitebine Grapes, or noted varieties of these kinds. In the Weald of Kent, in Sussex, Worcester, and Hereford, Grapes, Jones', and Mathons, are usually planted. Colegates are not now esteemed; for, though they are heavy croppers, and not so liable to blight or mould as the more choice sorts, they are coarse, and have a rank smell, resembling somewhat that of new inferior Americans. In some parts of Kent and Sussex, Colegates produce as much as from 20 to 30 cwt. per acre in a kindly year; but, in spite of this, they are not planted to any great extent.

It is almost the general practice to obtain sets for planting new

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ground, and for filling up from a distance, from some planter who has a good growth, and a reputation for being careful in selecting and managing his sets. A change of sets is thought as desirable as a change of seed in the cases of wheat, barley, and oats. There have been several new and improved sorts of hops introduced within the last few years, raised from seeds and from cuttings; in the former instance by mere accident or chance, in the latter by a careful process of methodical selection.*

As Dr. Carpenter says, the usual principle is, that propagation by seeds will only produce the species, the race not being continued with any certainty.†

The tendency is to revert back to the original type. This is seen in apples, plums, and in a marked degree in peaches, nectarines, and apricots. Seeds taken from the same hop-plant will, it is well known, produce different varieties, whose tendency is generally to degenerate to the wild hedge hop. This inherent tendency to reversion is augmented by the uncertainties of fertilization peculiar to diœcious plants, and the prepotency of the pollen of the original type over that of all others.‡ Hence, those sorts which have been raised from seed are, as a rule, coarse and inferior, as in the case of a sort called "Prolifics," which, though large croppers and of a hardy nature, are comparatively of low quality and not liked by the brewers. Some very valuable new sorts have been obtained from cuttings taken from solitary plants, which have been observed to differ from their congeners in certain characteristics. These specialities were further continued by a careful methodical selection of plants, in which the desired qualities were most prominently displayed. A very good sort of early Golding was obtained in this way by Mr. George White, of Hunton, Kent, which not only comes to pick a fortnight or three weeks before other hops, but has a fine quality. It is a very great thing to get such a sort of hop, of first-rate Golding character, which arrives at maturity early, in order that the English grower may be able to supply the market, before foreign hops come in, and to insure good color before the winds, the hot sun, and the heavy night fogs of late autumn have browned the delicate light golden hue so sought for by pale ale brewers. To get this much-desired color, it has been the common custom to pick

* "Methodical selection is that which guides a man who systematically endeavors to modify a breed according to some predetermined standard."—Darwin's "Animals and Plants under Domestification," vol. ii, p. 193.

† Carpenter's "Principles of Physiology," p. 985.

‡ But few planters allow male hop plants in their grounds, trusting that the pollen, for mere purposes of fructification, will come from somewhere. It is clear that artificial fertilization must be resorted to systematically if it is wished to obtain true and satisfactory sorts from seed.

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hops too soon, which tends to injure the stock of the plant, especially in the case of the Golding hop, more delicate by nature than other kinds, to lessen its productiveness, and to cause its premature decay. These combined causes are leading growers to reorganize their plantations upon a new system. In the first place, by gradually grubbing the very old grounds, many of which are practically effete from old age, the exhaustion of specific chemical elements from the soil, and naturally early picking. Secondly, by introducing a well-arranged succession of altogether earlier sorts, to follow each other in regular rotation.*

It is quite clear that new plantations must be raised upon such principles as will meet the changed requirements of the market; for it is utterly useless to endeavor to "level up" the old plantations to these altered conditions; and, independently of these, it is beginning to be understood that the once dearly cherished pet grounds of a century old and upwards are very costly luxuries. In the rare cases where a large per centage of the hills of such grounds do not die away annually, and where the stock is still fairly sound, there is a large decrease of productive power, with a greater predisposition to blight and mould, and diminished ability to grow away from their attacks. There are many of these almost historically famous hop grounds where a large proportion of the hills die away each year, so much so as to make a fair crop impossible. As many as from five to ten per cent of the hills in some old Golding grounds have to be renewed every year. I have a Golding ground, with an almost fabulous reputation for fruitfulness in past years, whose first planting not even the "oldest inhabitant" can remember. The average annual amount of hills to be renewed is 200 out of 4,000 hills, or just five per cent. As sets planted to fill up do not bear fruit until the second year, ten per cent of the hills in this old ground are actually non-productive each season. The quality of the fruit is very fine when, by happy accident, the ground gets through a blight or the mould; but the quantity obtained from the strongest hills is always very small. The situation is most suitable; the soil is a rich, friable, deep mould, with a substratum of hassocky ragstone, or limestone, which is the best possible soil for hops, affording perfect drainage, and being naturally rich in the mineral constituents necessary to the plant. The best bedded sets have been obtained from several planters for filling up this ground for the last ten years, without causing any very marked decrease of dead hills or increase

* In the Hereford hop district, growers are generally improving their plantations by planting early sorts of better quality and character.

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of fruitfulness. As probably nearly every hill has been replanted in the last twenty years by this yearly process of filling-up, the old age of the stock cannot be the cause of the decay, which must be rather attributed to the unnaturally early picking, and to the failure in the supply of requisite ingredients in the soil. This will not seem astonishing, when it is realized what an enormous amount of these ingredients is taken away in a crop of hops, leaves and bine. The most judicious and lavish supply of these manures which chemical science has taught to be suitable cannot adequately replace the potash, the lime, the phosphoric acid, the silica, and the other essential elements annually absorbed. Mr. Nesbit says, in his elaborate report upon the analysis of the hop,* that it is well known to farmers that hops require more manure for their proper development than any other plant which they cultivate. In this same report, Mr. Nesbit gives detailed statements of the quantities of each mineral ingredient taken from the land by a given crop of hops. Though he and Professors Way and Johnstone differ slightly, yet, if an average of the estimates of these three great authorities is taken, it leaves no doubt as to one great cause of the gradual failure of hop-grounds. The American hop-growers are quite aware of this, and as soon as a ground displays signs of having exhausted the soil, it is grubbed up. They manure very little, just putting a spit or two of dung on the crown of the hill, rather for the purpose of protection from frost, while the average of the duration of their grounds is not more than nine years even in the limestone district.

Digging and Ploughing.—After a ground has been planted for a year, it is dug or ploughed in the winter. The latter practice prevailed extensively at one time, as it holds universally in America, on account of the scarcity of labor. In an old treatise upon hops, date 1578, it is said, "Before winter you must till with the plough, *if* your ground is large; if small, with the spade."†

Several growers have introduced ploughing lately, with a small implement like a potato-plough, or a modification of the vine plough (charrue). This makes but poor work; the weeds are not buried, the large pole-stack places are not touched, and the appearance is slovenly and unfinished. If one of the many new systems of poling, whereby the poles are left standing permanently at the hills, is approved and generally adopted, one great obstacle to ploughing will be overcome. However, an entirely new implement is most necessary for this spe-

* Journal of the Agricultural Society of England, vol. vii, page 211.

† Quoted in Lance's "Hop Farmer."

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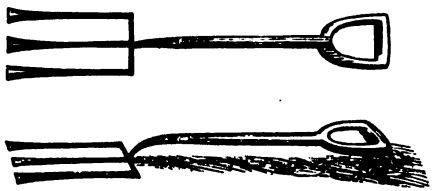
cial purpose; and I have suggested that the Council of the Royal Agricultural Society should offer a prize for the best and most economical substitute for digging hops. Digging is performed by a three-pronged "spud" or fork, as shown in the illustration, with a handle like a spade; if this is done in a workmanlike manner, it is a thoroughly satisfactory operation, and as cheap as any mode of ploughing that has yet been invented, at the present rate of payment, viz., from 16s. to 21s. per acre.*



Poling.—There have not been many great changes in the manner of poling hops. Four-pole work, or putting four poles to each hill, is not so much practiced as formerly in East and Mid Kent. It prevails still in the Weald of Kent and in Sussex to a considerable extent in the Jones grounds. In the former district, before creosoting was introduced, the Jones and sometimes the Grape were poled with four stout old poles from the Golding grounds. This supply has, fortunately, to a great extent failed, owing to the preservation of the poles by the creosoting process; and Grape and Jones are now poled with three twelve-feet or eleven-feet poles, much better suited to their habit and nature. Two poles are very frequently put to each hill in Golding grounds, or one row of hills is poled with two poles, and the next with three poles, and so on alternately. Planters do not, as a rule, pole their hops with such large long poles now. The feet of the poles are so effectually preserved that there is not the gradual diminution of length and consequently of girth which formerly took place from decay and annual sharpening. The bine, therefore, does not get that relief which, though uncertain and accidental, was yet appreciable in a considerable degree. So in old Golding grounds, where the poles are still very stout and the bine is weak, it is usual to help it by placing the fine tips of old poles, three or four feet long, close by the larger poles. The bine is tied to these smaller poles; when it has reached their tops it coils round the larger poles and goes up them with vigor.

* Mr. Boys, in his Survey of Kent, shows that the price paid for digging hops was, in 1795, from 15s. to £1; in 1803, from £1 to £1.5s.

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Creosoting or "Dipping" hop-poles has become almost universal. It may fairly be said that this is one of the most important improvements that have been made lately in hop cultivation, as by its operation the prices of large hop-poles have been reduced at least twenty-two per cent, and of smaller poles fourteen and a half to fifteen per cent during the last eight years, while in the same period the hop acreage has been increased by over 10,000 acres. Before dipping was introduced, it was usually estimated that, in hop grounds poled with sixteen-feet and fourteen-feet poles, one-sixth part of the whole number required renewing each year; and in those grounds poled with twelve-feet poles, about a fourth part. It is now calculated that in grounds where dipping has been practiced for eight years, only one-fifteenth part of the larger poles and a tenth part of the smaller poles per annum are wanted. The labor, expenses of poling, carrying in and throwing out, have diminished in a proportionate ratio. On the other hand, there are the extra expenses of loading and carting to and from the dipping tank of the preparations for dipping, and of the process itself; but taking every pro and con into consideration, it is generally reckoned that where creosoting has been steadily persevered in for eight years, from forty to forty-five per cent has been taken off the whole expense connected with the poling of hops. The operation of dipping is very simple. The poles are put upright into an iron tank of about two and a half feet to three and a half feet deep, seven, eight or nine feet long, three or four feet wide, with a small furnace underneath it, and a scaffold around to keep the poles upright. The fixed tanks are far the best, as there is much wear and tear indispensable from moving the tank from ground to ground, or from farm to farm. As much creosote* is poured in as will cover from one and a half to two and a quarter feet, according to their size, of the ends of the poles in the tank, with due allowance for boiling. The bark is previously shaved off from the ends of the poles, so that the boiling creosote may permeate through the pores and sap vessels of the wood. It is better to dip poles when green than to bed them for a year before dipping, as less creosote is required; the cellular tissues being soft, and the vascular layers full of sap, the preserving composition is more easily driven up and distributed by the atmospheric pressure. The watery parts of the tissues and sap are evaporated, the creosote takes their place, preventing decay from wet, air, and the attacks of insects.†

* Creosote is the residuum of gas tar, after the extraction of aniline, benzoline, &c., and varies much in quality, according to the coal used.

† In France poles are steeped in sulphate of copper, or the solution is forced up by heat, as in the creosoting process.

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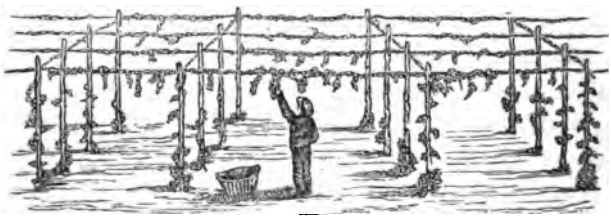
The poles are left in the tank for twenty-four hours, during at least twelve hours of which time the composition should be kept well boiling. It should be made to boil again before the poles are taken out, or it will become viscous and adhere to the poles. The price of creosote is now from 2d. to 2½d. per gallon, and the whole cost of dipping ranges from 2s.6d. to 3s.6d. per 100 poles.

New Modes of Poling and Training.—During the last few years many new plans for poling hops have been devised, the primary notions of which came from America, where poles and labor are dear, and inventive genius is particularly fertile. According to one of these plans, for which a patent was taken out in this country by Mr. Collins, one pole is put to each hill, and stout string or cocoa-nut fibre yarn is stretched horizontally at a distance of from eight to ten feet from the ground from pole to pole. The appearance is very picturesque, as may be imagined from the slight sketch given here:



But the system is not by any means satisfactory, and has been discontinued by many planters who gave it a fair trial. I have tried it for three years upon three acres planted with the Jones hop, whose habit renders it more suited to such methods of training than any sort of hop; I found that the expense of tying the bine to the horizontal strings was very great, the bine never took kindly to the string, so that the tyers were perpetually required throughout the summer, and that the produce was each year considerably less per acre than in another part of the ground poled in the usual manner, though in every other respect treated the same as the string piece. It is right to state that Mr. Gunner, of Alton, has had several acres trained in this way for some years, and is quite satisfied with the result. This gentleman writes, as to the extra expense of tying, "It is really nothing, when you think how much is saved in poles, how good the quality of the hop is, how little liable to damage from winds, and how strong your plant will always be; for I believe, if the string training is properly carried out, there would be no such thing as weak bine."

Training on wires, variously fixed, is practiced in America, in Ger-

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many,* and in France. In many districts of these countries poles are dearer than in England. At Spalt a grower states that they cost as much as a franc each, but then they are from twenty to twenty-four feet in length. Mr. Farmar, of Kyrewood, Tenbury, has patented a system of training hops on wire, consisting of an arrangement, according to the fancy of the planter, of vertical wires communicating with horizontal wires. Large posts, stouter than telegraph posts, are fixed at the end of each row of hops, to which wires are fastened at the top and bottom. These wires run horizontally from post to post, and at every hill vertical wires are fixed between these two parallel horizontal wires, to which the bines are tied. By an improvement in Mr. Farmar's process, the iron work is so fixed that it may be easily taken down at picking time.

Several planters in the Hereford, Worcester, and Farnham districts have adopted this method, and speak favorably of its advantages. The first cost of it is put at £46 per acre, and it is calculated that it will last for twenty years in an efficient state, while the usual method of poling is estimated at £37.10s., as first cost, independently of the necessary yearly renewals of poles. The main objects of these patentees have been economy of cost and labor, and to obviate the necessity of cutting the bine. The latter has at all events been achieved, and time will prove whether the former has been attained. The great objection to the string plan is that it is unnatural for the hops to be trained horizontally. The nature of this plant is to climb spirally toward the light, making its revolutions with the course of the sun. Besides these "normal axial twistings" round the support near, each internode of the plant during its own development makes independent revolutions, varying in number according to its growth and other circumstances.† Mr. Darwin remarks that "the purpose of this spontaneous revolving movement successively directed to all parts of the compass, is obviously in part to favor the shoot finding a support." It is manifest that a horizontal line would be quite out of the natural upward sweep of this movement, and that each internode must be fastened down to the slender string, as it commences its separate course. The axial twistings will be consequently multiplied, and the vigor of the whole plant diminished by these constrained efforts. In the case of vertical wires, it is believed that the bine would require constant tying, as its reflexed hooks would not have a firm hold upon the smooth wires, and that "short turns" would be general, which

* The Austrian Central Agricultural Society have offered prizes for a satisfactory solution of the question as to the relative superiority of wires and poles.

† "On the Movements and Habits of Climbing Plants." By Mr. Darwin. Williams and Norgate.

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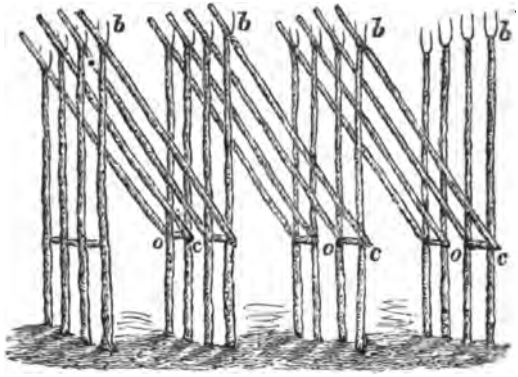
are usually thought to be indicative of want of vigor in the plant, and fatal to the chances of a good crop.

The late Mr. H. Boys, of Northfleet, Kent, patented a method of training hops along diagonally inclined hurdle rods, or old small poles fastened to uprights; Mr. Coley, of Maidstone,* invented a plan in 1868, on somewhat similar principles, which has been already largely



adopted, and has many advantages. According to this plan, two stout thoroughly creosoted poles, sixteen or fourteen feet, reduced to about twelve feet long, are firmly pitched to each hill east and west. These have, at the point "*b*," in the annexed drawing, two pieces of wire lashed to their tips to form a fork to receive a diagonally inclined pole of from twelve to fourteen feet long, which rests at the point "*c*" in a staple fixed to the upright pole of the opposite hill. A stout piece of wood, "*o c*," is nailed to the uprights at each hill, to keep them firm. These uprights are fixtures; the diagonal poles are lifted out at picking time and stacked away for the winter, after a new method of Mr. Coley's; but there can be no reason why this expense should not be saved, by simply replacing the diagonal poles, when stripped of bine, in their resting places in the staples and wires. They would hardly be more exposed to the weather than if they were stacked as at present, a great deal of labor would be saved, and the ground would be clear for all operations of manuring, digging, or ploughing. In Mr. Coley's system the evils of horizontal training are greatly modified, and the bine has a congenial support to cling to. High winds do not damage the hops, and the plant being cut high does not bleed to any extent. Mr. Coley says in his pamphlet, writing of last year's crop of hops, "In the early hops we picked at the rate of 1 cwt. 3 qrs. 4 lbs. per acre extra on the patented plan, and in quality worth

* See a pamphlet called "The Vinery Principle of Growing Hops." By Mr. Coley. Published by West, Maidstone.

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10s. per cwt. more than those of the same sort grown upon upright poles. In a Colegate ground, picked after the severe gale of wind, we found on the new plan 4 cwt. per acre extra; these were sold at £5 8s. per cwt.; those adjacent of the same sort, grown upon upright poles, fetched £5 2s. per cwt."

The first cost of poling an acre in this way is given as £52 3s. 4d., as against Mr. Coley's estimate of £41 6s. for the old mode, while the after expense per acre for keeping up the poles for fourteen years is estimated to average 15s. per acre in the former, and in the latter instance £4. This applies to Golding grounds poled with best poles. Mr. Coley has invented a whole set of implements and tools suited for the working of his system, among which may be mentioned a long-handled bill hook with prong attached, for cutting the bines high up and pushing them off the uprights, and a three-wheeled dung cart for use between the rows.

Lately it has been the custom of some growers at picking time to cut the bines growing on the ordinary poles four or even five feet from the ground, and to push the upper part of the bine with the hops upon it over the poles with forked sticks, as the bine when cut high and thus left on the pole is supposed not to bleed so much as if cut low and left on the ground.

Hops are now poled as early as possible, that the bines may be tied up to the poles before they run along the ground. It is usual to pull out the most forward or rank growing, called locally "pipy" bines, and to tie two or three bines, according to fancy, to each pole. It is now understood that it is a mistake to put more than three bines to a pole. After tying, the ground is dug close round the hills, about a foot and a half from their centres, to loosen the soil which cannot be touched by the nidgetts, implements something like horse hoes, only wider, and having more tines, which are drawn by one or two horses in the alleys, between the rows of plants, to pulverize the soil and to kill the weeds. The first nidgetting is generally done with two horses, to get the soil deeply moved; afterwards one horse will suffice. Deep nidgetting is continued at intervals until the middle of June or the end of July, when the fibres begin to "work" and run all over the ground. After this time it is a huge mistake, as a rule, to nidgett deep. To hill seedling weeds and to break the crust formed by the beating of rain and the baking of the sun, a much more shallow nidgetting is performed, or a hop harrow, a nidgett with shorter-pointed tires, is used. The form and make of nidgetts have been much improved. Many planters have iron ones, which are better

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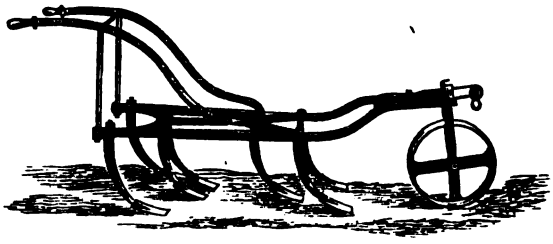
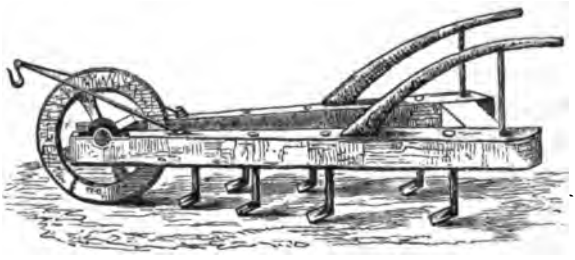
and more workmanlike looking instruments, as may be seen from a comparison of an old with a new nidgett in the figures.

New Iron Nidgett.



Old Wooden Nidget.



Very late deep nidgetting is much discontinued, as well as late digging. In blighting years these operations are occasionally resorted to to let the draught into the ground, thereby to check the flow of sap and starve the aphides and green lice. If proper weather follows, the results of these processes have been traditionally known to prove successful; but experience has shown that the chances are quite against a favorable issue, and that if the besiegers are starved away by these *derniers ressorts* the fortress itself will be so much reduced as to be practically useless. The ancient Chinese mode of obtaining roast pig, according to Charles Lamb, is almost as defensible as these roundabout practices. Earthing, or putting a few shovelsful of earth on each hill to keep it from wet, and to get strong sets for bedding, is done about the end of June; but the operation is not performed so usually, nor so much as a matter of regular routine, as it used to be. Hop plants that have not been earthed always come stronger and more forward than those that have been earthed; and if it were not for the necessity of saving sets and the untidy appearance caused by the bines running all over the ground, it is questionable whether

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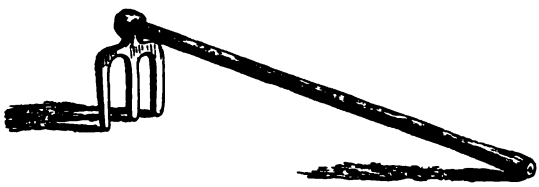
carthing would not be a custom "more honored in the breach than the observance."

In July and August, the space round the hill which was dug in May is chopped round with that most excellent tool, which "Talpa" would fully appreciate, known in Kent as the "Canterbury Hoe." This operation breaks the hard crust and admits the air, at the same



time displacing the weeds. No leaves should on any account be stripped from the bine; whether blight or mould appears, the leaves should be left on. It was an old custom to strip the leaves off the bine four or five or even six feet up the poles, thus in the first place bleeding the plant according to the most obsolete Sangrado doctrines, and limiting its capacity to receive and assimilate those gases from the air which are congenial,* and to exhale those which are uncongenial to its nature, or are in excess of its requirements. By lessening the leaf area of the plant, the wonderful action of light upon it in the decomposition of carbonic acid is proportionately diminished,† and it is a question whether the growth of mould fungi may not be thus encouraged, by causing an abnormal or diseased condition, or in other words by the retention of an excess of carbonic acid.

Manures.—Rags, shoddy, farm yard manure from oil cake fed animals, sprats and other fish, rape-dust, guano, superphosphate, fur waste, bone-dust, and blood manure, are the manures most suited for hops, according to the nature of the soil, as science or experience dictates. There are many others, and the list has much increased in the last quarter of a century. Rags, sprats, and farm yard manure were the chief manures before then; but farm yard manure was the manure *par excellence* in the opinion of the grandfathers of present planters.

Great mixens lay reeking and rotting as close as possible to the farm house door, draining out their valuable essences into the adjacent

* "If the experiments on the functions of the leaves be duly considered, it seems difficult to avoid the conclusion that the greatest addition to the materials for the formation of the solid tissues of plants is made through their agency."—(Dr. Carpenter's "Principles of Physiology," par. 558.)

† "This fixation of carbon by the decomposition of carbonic acid is the most essentially dependent of all the processes of the vegetable economy upon the influence of light."—(Dr. Carpenter's "Principles of Physiology.")

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horse-pond with every shower, all through the summer and autumn, until the winter frosts hardened the land sufficiently for carting. Then the manure was laid in lumps on the land, not spread, perhaps, for weeks. Now, however, most farmers know better. The scientific papers on this subject which have appeared from time to time in this Journal, and especially the exhaustive one by Professor Voelcker,* have changed all this; farmyard manure is now generally made in the late autumn and winter, and, if the weather permits, is used directly, or it is put on in the spring, when the hops are poled with the dung-dolly, a low, narrow, four-wheel cart, drawn by one horse in the alleys. The nidgett mixes it with the soil, rains wash the more soluble parts gradually down to the roots, and the innumerable fibres moving about just below the surface of the ground with almost intuitive sagacity in search of aliment seize upon and weave themselves into the coarser structures and extract their properties. It was a common practice to put lumps of wet unctuous manure into trenches hoed out close round each hill, in seeming ignorance of the fact that the rootlets and fibres are spread all over the ground, and that the requisite changes in the crude, natural *vile corpus* of the manure, necessary to render it fit pabulum for the plant, are arrested by burying it from the air and light. Rape-dust, or finely crushed rape-cake, is a fine manure, on account of its abundance of nitrogen, for forcing bine and stimulating the plant. It is more lasting than guano, and its effects may be seen for two seasons. "Fur waste" is another recent and most valuable manure, whose market value has been doubled within the last few years. Planters generally manure more highly and much more rationally and systematically than they did a generation since, both as regards the selection and the mode of application of manures. Their choice of manures has very much extended, and the cost has also largely increased, so that it is difficult to thoroughly manure an acre of hop-land under from £5 10s. to £7 10s. A machine like a large chaff-cutter, worked by three men and a boy, has been brought into general use lately for cutting hop bines into short lengths of about three-quarters of a foot. The bine thus cut is either spread on the land green as it is, or taken into the yards, where it quickly absorbs manurial matters, and, being put into the mixen, is ready for carting after once or twice turning. This is a great improvement upon the old system of putting the bundles of bines, three feet long by two feet wide, green into the yards, or the

* See "Farmyard Manure, the Drainings of Dung-Heaps, and the Absorbent Properties of the Soil."—"Journal of the Royal Agricultural Society of England," vol. xviii, part 1.

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alternative of putting them in stacks for a year, to become brittle and be more easily trodden to pieces by bullocks. Covered yards or covered mixen places are not thought necessary, but the latter have either brick and cement dams where the ground falls, or the ends and sides of the mixens are carefully plastered with mud to prevent the escape of the liquid manure.

Blights.

Aphides, or plant lice.—Various and wild have been the theories and speculations as to the origin of aphides, the cause of blight in hops. It has been gravely maintained even by close observers that the eggs of these aphides are wafted by the east wind in that peculiar blue mist or haze which so often accompanies it. Some scientific men asserted that the atmosphere is laden with the eggs of insects; but as the specific gravity of the eggs of every known species of insect is greater than air, these were manifest delusions. Moreover, the fertilized eggs of aphides, according to Latreille, are covered with a sticky substance, so that they remain through the winter where they are deposited in the autumn, and those that escape the action of wet, frost, and other accidents, are hatched in the spring as the perfect winged insects.

It is true that blight most often occurs after cold east winds, dark gloomy weather, and in seasons of sudden variations of temperature. These variations affect and alter the juices or sap of the plant, causing an excess of saccharine matter, at the same time affording suitable and attractive food for the aphides, which are always present, ready to seize upon the opportunity, their increase and power of blighting depending solely upon the quality and quantity of the food thus provided for them. With regard to the "honey dew," the viscid substance which is spread on the upper surface of the leaves after the aphides have been at work for some time, the effect has been mistaken for the cause. It has been thought that this was a morbid exhalation of the leaves, and that it attracted the aphides by its sweetness. That generally accurate observer, White, of Selborne, was deceived as to this, failing altogether to perceive that it is caused by the insects themselves;* that it really is the excretion of the countless generations of lice swarming on the under surface of the leaves.†

* "The reason of honey dew seems to be that in hot days the effluvia of flowers are drawn up by a brisk evaporation, and then in the night fall down with the dews, with which they are entangled."—White's Natural History of Selborne, p. 304.

† "By means of a lens we have actually seen the aphides ejecting the honey dew."—Knight's Library of Knowledge; Insect Transformation, p. 19.

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The pores of the leaves are soon choked up, the exuviæ of deceased generations adhere to the sticky fluid; and the oxygen of the air, acting upon the whole, soon turns a green flourishing hop-ground into a black mass of desolation. Until the last few years, no remedy has been discovered at all successful or satisfactory. Some burned green fagots, or heaps of green rubbish, weeds, bushes, or turf, to windward of their plantations, that the smoke might stifle the invaders; some threw lime, rape-dust or powdered tobacco over the plant; some, as has been noticed before, tried to starve out the intruders through the diminution of the sap of the plant by excessive cultivation. By 'Kirby and Spence' the hop-growers are censured for their ignorance of entomology, and supineness, because they did not set persons with ladders to catch and crush "between the thumb and finger"* the aphides (fly) which first make their appearance. This astonishing advice is gravely repeated by Mr. Wood in his work called 'Our Garden Friends and Foes.' Hop-growers have tried a good many absurd experiments to stop a blight, but, to their credit, it must be said that they never attempted such a wild-goose crusade. Washing or squirting the bine all over with water, soft soap, and sometimes tobacco juice, is the best means of prevention, and is tolerably efficacious, if the operation is carefully performed by the workmen, and judiciously timed by the grower. It is a mistake to begin washing on the first appearance of fly, as, if they are washed off to the ground, they may recover and fly up again, or others, later hatched, may take their places. When the great green lice are reproducing their kind by the process of "gemmation," believed to be an unique instance as regards insects,† one washing, if thoroughly done, causes great slaughter, and may clear the plant thoroughly. The washings may be repeated at intervals of ten days, once or twice if necessary; but it must not be done while the plant is in "burr," or bud, nor when the flower is beginning to ripen, lest the "condition" or farina be injured.

The process of washing is carried out by means of a common large garden engine, with a pump and a long gutta percha hose on each side, fitted with a simple jet and rose, or "spray" syringe, to be used as the height of the plant and other circumstances require. This

* Kirby and Spence's "Entomology," page 101, seventh edition.

† "The aphis is capable of propagation by a process that appears to be analogous to the gemmation of the salpæ; the new individuals being budded off, so to speak, from internal stolons, instead of being developed from ova provided by the female and fertilized by the male. This method of propagation may be several times repeated; the individuals thus generated being all apparently of the female sex and generating others like themselves."—(Dr. Carpenter's "Principles of Physiology," p. 385.)

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engine, filled with the mixture, is pushed along each alley by three men, one of whom also pumps; the other two take a hose each, which is long enough to enable them to wash two rows each. Two, three, or even four men are required to bring the mixture to the engine from the tubs at the nearest point on the outside of the hop ground. The usual wash is composed of 28 lbs. of soft soap to 100 gallons of water, with ¼ lb. of tobacco. Some use soft soap and water without tobacco, as they think that tobacco kills the "negur," the larva of the ladybird or fly-golding Coccinella, which feeds upon aphides.* The cost of once washing is estimated at from 30s. to 36s. per acre, being 18s. for soap, 12s. for labor, 6s. for tobacco. Growers who have a very small plantation use hydronettes, or small hand-syringes, with a long hose which goes in a pail.

Red Spider.†—The injuries done by this little insect, *Acarus Telarius*, had been, until quite recently, attributed to other causes. The peculiar appearance of the leaves of the hop, called in England "fire-blast," and in Germany "copper burnt," produced by this mite, were thought to be due entirely to drought and excessive heat. It is only in very hot, dry weather that the red spider does much mischief. So it is easy to understand how the effect of its absorption of the juices of the plant came to be attributed to drought. In the unusually hot dry summer of 1868, this spider did immense damage in England and on the Continent. The leaves turned brown, dried up, and came off the bine as if it were late autumn, and thousands of acres produced nothing. Washing or syringing with plain water would stop their progress, did they not envelope themselves in a thick downy web, not for food-providing purposes, like other spiders, but for protection from cold, wet, and other attacks. Mr. Barling, of Maidstone, recommended in 1868 a solution of sulphur to be thrown up by the washing-engines. This was tried by Mr. Reeves, of Staplehurst, whose experience was "that it certainly killed the spider, but it was done too late to save the crop." Now that the cause of "fire-blast" is discovered, washing with this solution of sulphur will be generally adopted when the conditions of the temperature again favor an extraordinary development and increase of the red spider.‡

Mould (*White Blight or Mildew*).—This white blight was more

* I washed some hops in the last disastrous blight with soft soap and tobacco, and some with soft soap without tobacco. There was no difference in the very favorable results of these respective mixtures.

† Latreille divides Acaridæ into the following groups: 1. Mites (*Trombidites*); 2. Ticks (*Ricinites*); 3. Water Mites (*Hydrachnellæ*); 4 Flesh Worms (*Microphthira*).

‡ The fumes of sulphur destroy the red spider in green-houses and hot-houses, and sulphur ointment kills the mite causing the itch.

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dreaded than the black blight. As to the latter, there was a chance of a thunder-shower, or other atmospherical agencies, clearing it off; but when once the former had appeared, it usually went on with its work of destruction until the bitter end.* Now this was, until lately, thought to be the result of a morbid state of the tissues of the hop plant; whereas the microscope has proved beyond a doubt that it is a fungus, whose spores are floating about in the air, ready to develope themselves wherever and whenever the fitting conditions of food and temperature are offered them.† Mr. Cooke, the careful micologist, classifies this fungus as *Sphærotheca Castagnei*, of the group *Erysiphe*, and states that it is a common form found upon hops, meadow-sweet, and various other plants. It is allied to the rose mildew, *Sphærotheca pannosa*. The vine disease is another form of *Erysiphe*, and all these, as Mr. Cooke states, "are not in themselves perfect plants, but merely conditions of other fungi of a higher order, little differing, it is true, in external appearance to the naked eye, but offering material differences in structure under the microscope.‡ This dimorphic habit of parasitic fungi was noticed by Professor Henslow years ago, especially with regard to *Uredo* and *Puccinia graminis*, as to the one form being capable of development into the other,§ and the doctrine of alternation of generation of fungi has been lately further illustrated by Dr. A. de Bary, and by observations made in France by M. Piret, both of whom have ascertained that one of the fungi which produce the rust in cereals, the *Puccinia graminis*, and the fungus which causes the well-known orange spots on the leaves of the Berberry, the *Œcidium Berberrides*, are, in reality, different forms of the same plant; the spores of which will not reproduce itself, but the other form.‖ So that farmers were not altogether wrong in their prejudice against the Berberry, nor hop-growers in their decrees of banishment against this and other plants and trees from the vicinity of their hop-grounds.

Looking at all these revelations of science, it is wonderful that mould is not more prevalent in hops, and it is fortunate that an almost certain preventive against, and destroyer of, these fungoid growths has been discovered in sulphur, which has been largely and

* Mr. Buckland, in his prize essay in the "Royal Agricultural Journal," in 1845, upon the Farming of Kent, writes of the mould in hops, that "its causes and nature are very little known, and the means of preservation is a matter involved in even greater obscurity. Its destruction of the crop is frequently complete."

† Carpenter's "Principles of Physiology," par. 272.

‡ Cooke's "Microscopic Fungi" (Hardwicke), p. 35.

§ "Annals of Natural History," vol. vi; also, Carpenter's "Principles of Physiology," on the same subject.

‖ See "Journal of Botany," for 1866; and the "Quarterly Journal of Science," for April, 1870.

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most successfully used on the continent, since 1857, to prevent and check the fearful ravages of mould, vulgarly called oïdium, in the vineyards. M. Vialles, in 1857, in a clever pamphlet upon sulphuring vines,* remarks: "Si cette méthode eut été connue en 1853 ou 1854, la viticulture universelle aurait éveté une perte de plus d'un milliard de francs qu'elle à subie seulement dans les trois dernières années;" and from this work generally much useful information may be gathered as to this process, which is performed systematically at regular times, and not in the hap-hazard way in which it is done in England. In France, the vines are sulphured three times; there is the "Premier soufrage avant la floraison; second, soufrage pendant la floraison; troisième soufrage après la floraison." In Spain, where sulphur has been used for seven years, the process is performed twice, but neither in France nor Spain is it ever done after the grape has commenced to ripen, as the sulphur would then impregnate the wine with a nasty flavor.

Those hop-growers who have sulphured upon a smiliar principle, looking upon sulphuring as an essential part of cultivation, and have first sulphured when the bine is just up the poles, about midsummer, whether mould has or has not appeared, again in about a fortnight or three weeks, and still again in ten days if requisite, have experienced the best results. Too frequently sulphuring is not resorted to until mould is fairly established, or when the hop is in full flower; so that, as in the case of ripening grapes, the flavor of sulphur is imparted to it. This practice of late sulphuring, which, besides checking mould, also makes the hops keep their color, is wrong, and has made the brewers take a not unreasonable objection to all sulphuring whatever, although it is certain that sulphuring before the flower is fully formed does not injure the flavor of the hops. Growers who have used sulphur legitimately, and who in some seasons would not have grown a sound hop if they had not so sulphured, are gravely asked to give a guarantee that they have not used sulphur.† A guarantee might in justice to the brewer be required that sulphur had not been used after the hop was in flower, but should not in common justice to the grower be extended over the whole season. It has been demonstrated over and over again, that sulphur does stop the mould if it is properly applied, and there are many theories as to its action. One is that it acts as an escharotic, and that other fine powder, such as road dust, whould have a like effect of absorbing

* "Guide pour la preservation des vignes par la methode preventive." Beziers, 1857, Paul Librairo.

† In the code of regulations of 1860, decreed by the pundits of the little town of Spalt, sulphur is forbidden to be used.

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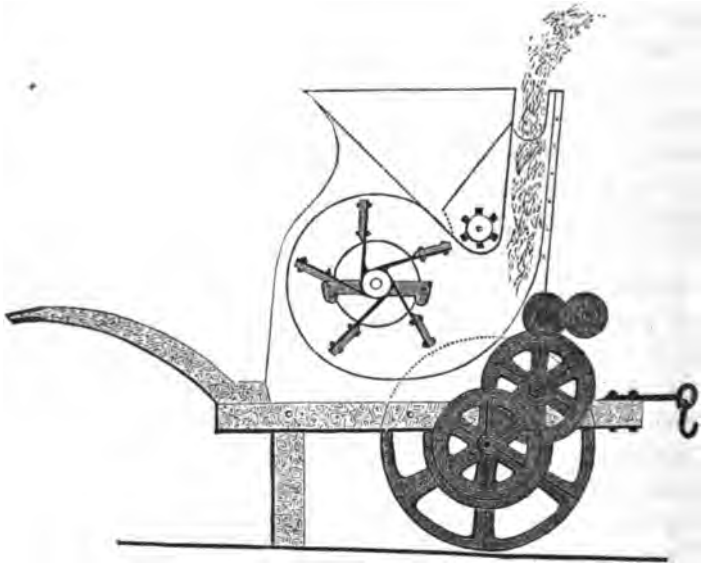
moisture from the mould-germ, and so causing its destruction; or by chemically uniting with and absorbing its oxygen.* M. Vialles holds this former opinion, and believes that the theory of *volatilisation* is a deplorable error. It must be confessed, however, that it does seem more feasible than the sulphur, combining with moisture and oxygen, gives off fumes and vapors of sulphurous acid, which are prejudicial to the developement of fungi, at the same time being so gradually evolved as not to injure the other vegetation. And this is probably why it acts more quickly in damp weather.

The sulphur is thrown up evenly over the plants by the revolving fans of the sulphurator, as here illustrated. The quantity thrown up



is regulated by a screw, so that from forty pounds to two hundred-weight can be put on per acre. From fifty to eighty pounds suffice for each application. The weather should be calm, and night is the better time for the operation, as the moisture fixes the sulphur on the plant. Great quantities were showered down when sulphuring was first introduced from large dredges, like those which are used in the vine-yards. The cost of each sulphuring ranges from 11s. to 15s. per acre. One horse with a man and boy are required. The best, or sublimated sulphur is usually preferred, but some growers who have watched

* Professor Brazier, Professor of Chemistry at Aberdeen University, holds this opinion from having noticed the effect of road dust upon mould in the parts of gardens adjoining roads.

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and carefully compared the action of this with what is called sulphur vivum, or black sulphur, much prefer the latter. This, as M. Vialles terms it, *Soufre brut*, or the crude sulphur merely melted by heat, and the stones and foreign matters disengaged, allowed to cool and then broken for sale, is more highly esteemed for vines than the refined or sublimated sulphur.

Harvesting.

Picking.—The legitimate time to pick hops is when they are quite closed up at the tips, rustle or crackle on being touched, when the farina is of a rich golden color, and the seeds perfect and firm. The longer, in reason, they are allowed to hang, the better they weigh and the more condition they gain if they are free from mould, aphides and flea.*

As the brewers will have bright hops, which they say are essential for pale ale, the growers' great aim is to secure their hops before they are tinged by the weather, or assume the naturally darker shade accompanying full ripeness. The loss of weight consequent upon this early picking is very great, much injury is inflicted upon the stock of the plant, and the genuine brewing qualities of the hop are decreased. As many as eighty bushels of green hops are required for 1 cwt. of dried hops at the commencement of picking, and from sixty-five to seventy at the close; while in the old times, when picking did not begin until the hops were quite ripe, the average number of bushels to the cwt. was about sixty-five. Picking is now much expedited; it rarely lasts longer than three weeks. The largest growers who are well off for kiln-room, get their hops picked in fifteen or seventeen days. Five weeks used to be the usual time, and six weeks in years of heavy crops. At the latter end of these very protracted picking seasons, many of the hops were "flyers," and when there were aphides present they got "black at the strig," or as brown as coffee berries from sun and air. This did not matter much then. They were put into "bags," traditionary receptacles of refuse and rubbish, made of very coarse fibrous hemp, holding 2½ cwt., and used for porter, whose dark color covered a multitude of sins, and which no doubt, formed a highly nourishing drink. If these hops were too palpably bad, the growers bided their time, waiting for a blight and extravagant prices for everything like hops. These were the halycon days of duties, before America and Bavaria were dreamed of *quâ*,

* This insect (*Haltica concinna*) is very injurious to the bine in the early spring, particularly in dry weather, and where the land is rough and partly cultivated. In some seasons, it follows the plant all through its stages into the very flower itself, making it light and comparatively worthless.

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hop growing countries in the philosophy of hop growers, when there were only about 44,000 acres to supply the world: when each noted "growth" was as eagerly bought up as the grand *crûs* of chateaux Margaux and La Tour. Hops are not only picked in much less time, but, they are much better picked. More care is taken to keep the leaves from them, and to pick them singly. As leaves and branches spoil the "sample," great pains are taken in East Kent and Farnham to have the hops picked well, and "Mid" Kent and the other districts have certainly followed their example lately, in some degree. An improved "bin" or portable frame, to which a cloth is fastened for picking hops into, is coming into general use. The improvement in this consists in its being made so as to fold up, and thus to be easily carried by one man, in moving from ground to ground, besides taking up much less room in waggons or carts than the old-fashioned, stiff, unwieldly frame.

Attempts are being made by a society* to establish a system of agency, for the better regulation of the supply of hop-pickers in Mid Kent, and to bring about an improvement in their lodging accommodation, and in its general sanitary arrangements. At present a certain number of persons, some time before hopping, flock down to the hop districts upon the chance of being engaged for picking. They fill the casual wards of the Unions in these districts nightly, until picking commences, and they are, to all intent and purposes, vagrants until then. A large majority of hop-growers, however, have their regular hoppers, to whom they communicate the time when the picking will commence. The society has not yet done much, owing to the bad hop crops of the last few years; but, in one or two instances, it has promptly found pickers to take the place of others upon strike, and it is probable that, if it is well supported, it will be the means of introducing a better and more orderly class of pickers, who will take more pains and care in picking the hops, and over whom the growers will have more control than at present. In the Farnham hop district the pickers are, in most cases, collected for the growers by agents, who are paid about 2d. per head.

The lodging accommodation is, on the whole, far better than it was twenty years ago, especially upon large plantations. Upon most of these now there are brick and tile built dwellings, water-tight and warm, with places for cooking, and, in some cases, decent provisions In many places tents, cast soldier's bell-tents, are used, which are very much liked if the weather is fairly warm. A large grower near Maid-

* The society for the employment and improved lodging of the hop-pickers President the Earl of Romney; Secretary, the Rev. J. Y. Stratton, Ditton, Maidstone.

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stone puts under canvas nearly the whole of his pickers, whose fires at night make it seem as if an army were encamped. Formerly cattle-sheds, straw-huts and temporary erections of any sort were thought good enough for hoppers, even by the largest growers.

Drying.—To prevent the green hops from heating in the pokes or sacks in which they are conveyed to the oast houses, whereby their color would be greatly injured, they are laid upon scaffolds that the air may pass through them, and the wet, in case of rain, drain from them. With regard to the drying process, the principle has not greatly altered though the practice has certainly improved. There is, however, a certain absence of scientific data with regard to the process, and experience or practice unassisted usually directs an operation which requires, one would imagine, a knowledge of chemical principles, as well as of the effect of heat at various temperatures upon volatile essences and vegetable tissues.

A slight excess of heat, or an irregular application of it, spoils the look of the sample, makes the hops brittle and harsh, and "smell of the fire." The lupulin escapes bodily from the petals in remarkable quantities, falls through the interstices of the hairs,* adheres to the sides of the kilns, the floors of the cooling-rooms and to the clothes of the dryers. Growers now check such a waste of this appreciable golden lupulin, and do not exult, as their ancestors did, at seeing their dryers in thick yellow crust, composed of the best part of the hops; but the greater number of growers do not think of, or perhaps are ignorant of, the far greater though imperceptible loss, by the action of excessive heat, of those aromatic essences from the hops which are all valuable to the brewer—of that essential oil,† which gives aroma to beer—of that bitter principle, or lupuline, which preserves it and makes it so wholesome and grateful. The gradually dried hops of Spalt, to take one Bavarian district, are highly esteemed for their superior flavor, due to the retention of all their valuable properties; and the English growers who have plenty of kiln room, and are thereby enabled to dry their hops more gradually, without subjecting them to very high temperatures, invariably get better prices than their neighbors who crowd their hops on their kilns and subject then to great heat. But far more attention is paid to the general subject, more time is allowed, and the fires are kept up with more system and with more evenness of temperature. In many oasts‡

* Hops are dried upon horse-hair stretched over stout laths above the fire places of the kilns.

† Professor Brazier writes, "in an experiment with beer, I extracted all bitter flavor, at the same time I obtained a fragrant aromatic oily body, reminding me more than anything I have ever smelt before of the beautiful odor in an oast-house where hops are being dried."

‡ Oast or oast- house means a group of kilns with stowage.

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thermometers are always kept for the guidance of the dryers, and in some few self-registering thermometers, by which the grower or his bailiff may see at a glance whether the statements of the dryers as to the wet state of the hops or the coldness of the night are valid excuses for mismanaged hops. Before color and choice quality were indispensable, there was comparatively very little oast-room in proportion to the hop acreage. Great loads of green hops were put on the kilns; from 1¾ to 2¼ bushels were heaped upon every square foot of hair, making it almost impossible for the heated air to pass through with anything approaching to uniformity; the under hops were drawn down to the hair, while those above remained in *statu quo* until they were turned, which process was several times repeated. Good managers have plenty of oast-room, put their hops very lightly upon the hair, no more than a bushel or a bushel and a quarter to a square foot, and rarely have them turned more than once, and in some cases not at all. It is held that they should never be turned, as the temperature in the hops immediately above the hair ought not to be higher than it is just under or about the upper hops. In other words, the load should be so light as to offer no resistance to the thorough permeation of heated air through every part, and every hop should be simultaneously dried.

After the load came off, the old custom was to leave the hops for as long a time as possible spread over the cooling-room in a thorough draft. Then they were raked about, sometimes screened or sifted, and finally trod into pockets or bags by men, the continuous action of whose feet broke the hops more or less into pieces. The load, or oasting, is now put into a lump, and after six or eight hours the hops are pressed into pockets* by a machine called a hop-presser, which is fast superseding treading by foot. This machine relieves the men of a work both laborious and injurious to health, and packs hops that are properly managed nearly as whole as they were picked, with a great saving of time and expenditure. By this machine hops are put together much more closely than by the old way of treading, while their aroma and general brewing qualities are better preserved. The presser made by Messrs. Garrett of Maidstone is much used in Kent and in Worcestershire. This is a capital machine, by which a greater amount of direct pressure can be obtained than by any other yet offered. The price is £27 with weighing apparatus complete. At Farnham† and in parts of Kent a more simple machine is used, cost-

* Pockets are made of coarse canvas, two and a half feet wide by five and a half feet long, containing from one and a half to two cwt. They have entirely superseded "bags."

† Mr. Elliott, of Farnham, makes an improved hop-presser, which is used to a considerable extent in the Farnham district.

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ing £13. This is not so easily worked, and does not put the hops so tightly or so evenly together as Messrs. Garrett's presser, which may also be used for straining or packing them more tightly when the market is lost, and they must be kept, or for exportation.

The kilns of old days, a few of which may still be seen in parts of the Weald of Kent and Sussex, were built upon the cockle principle, having chimneys to carry the smoke away from the hops. These were necessary when wood and household coals were principally burnt, but since anthracite coals and coke have been introduced chimneys have been abandoned, and open stoves, or stoves horsed over with brick work, or with an iron plate hung over them, are generally prevalent. The hair-level of these primitive kilns was only about seven feet from the fire; the distance from the hair to the cowl, and the width of the aperture at the base of the cowl, were matters of no calculation or consideration. In the modern kilns, the hair-level is, at least, thirteen feet from the fire, and in all these buildings, whether circular or square, the relative proportions, length and width of the various parts, are carefully observed. It has been ascertained by scientific researches as to the weight, velocity, and desiccating power of heated atmospheric air, and confirmed by experience, that the height of a circular kiln above the hair should be one and a half times its diameter at the hair-level, and that the opening at the summit for the egress of air should be one-seventh of the same diameter. It is also calculated that, according to the present method of drying hops, apertures for the admission of atmospheric air should be judiciously arranged and carefully regulated in the lower part of the kiln under the hair, upon the following scale, viz.: Six feet of aperture (superficial) for a sixteen feet kiln, eight feet of aperture (superficial) for an eighteen feet kiln, and so on, in order that the greatest possible amount of moderately heated air may pass quickly through the hops. Hops were formerly stewed dry by concentrating stove heat upon them. Now the great object is to desiccate them, to drive off their moisture, by a process as nearly resembling the action of the sun and wind as can be suited to the circumstances.

Hops while stewing, according to the old recipe, give out a sweet odor, which may be smelled a long way to leeward of the oast. This escape of essential aroma, once hailed with delight as satisfactory evidence of the good qualities of the hop, is deprecated and avoided by growers of the present day. It is understood that the temperature to which hops should be subjected, ought not to exceed 130°; beyond that point it is generally admitted that a serious loss of essen-

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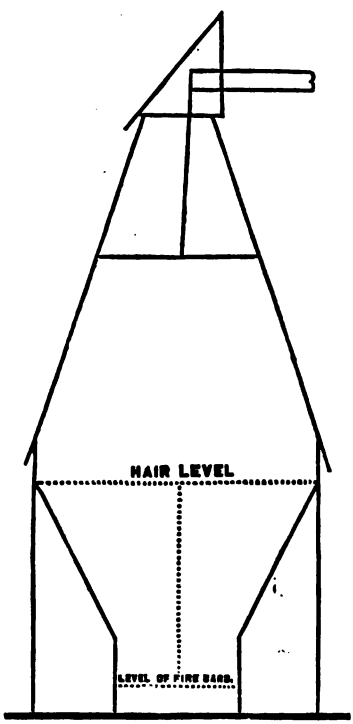
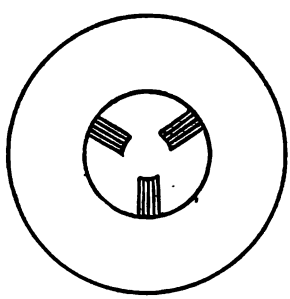
tial principles occurs. In the opinion of those who have studied the the question, a mean temperature of 110° would be far better; but the brewers do not recognize the increased value of samples so treated by giving a corresponding increase of price, and the expenses of such management being nearly doubled, it follows that the practice of drying two loads in twenty-four hours, at or about a heat of 130°, is universal. The circular is the most usual form of kiln, as it occupies less room, while it affords more available space than any other shape. Air apertures may be more easily arranged, and there is not so much resistance to the circulation of air as in square kilns, which are preferred by some, because they may be converted into cottages or like useful buildings. Some prefer an inner circle or chamber; others hold that it is superfluous. According to the usual mode of drying at a high temperature, the inner chamber or circle has many advantages, as it diminishes the loss of heat by radiation, at the same time confining it and concentrating its action. For this reason illustrations of a ground plan, and a section of a kiln with an inner chamber are here appended.





In the Farnham district many of the oasts are long narrow buildings, looking more like a row of cottages than anything else; in fact, they

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are so built that they may be turned into dwellings, if occasion should require. The ends of the roofs are left open for the escape of air and reek. Mr. Collins, of Maidstone, a few years since, patented a process for drying hops, by means of hot air passed through rows of pipes immediately under the hair. Mr. Sampson, of Wittersham, also took out a patent in 1867, for an invention called an "atmospheric regulator for oast-houses." The principle of this consists of an air-tight kiln, with two iron doors to the furnace, fitted with louvres or sliding bars to admit draughts of air.

There have been several other inventions of a somewhat similar character, none of which have been adopted to any extent. Steam would be the best and the most easily regulated medium for drying hops, but the application of it would be costly, as it would probably necessitate the reorganization of existing buildings;* and there always has been, and always will be such an uncertainty as to the future of hop-growing, that no one has liked to incur extraordinary expenditure or to try experiments upon an important scale. With regard to the firing used for drying, there are different opinions. From experience, Welsh coal, with plenty of charcoal, produces the "softest" sample, most free from any smell of smoke. The usual practice, however, is to use coke and Welsh coal, in equal proportions, with charcoal for lighting up and making up the fires. Brimstone is not so lavishly applied as formerly to hops while drying. Mr. Rutley says of this, that the burning of brimstone "should be begun soon after the hops are laid on, and continued gradually and slowly burning for from four to five hours."† A small quantity is now used just after evaporation of the moisture of the hops has commenced. It is burned off as quickly as possible, and very rarely used more than once. The effect of brimstone at this particular stage is to bleach the hop to a certain extent, and to make it generally brighter. Hops which have been brimstoned at several various times during the drying, have been compared with others of the same kind in every way, only brimstoned once, and not the slightest difference in color could be detected between them.

It is believed that there is nothing else to chronicle as new with regard to the cultivation and management of hops; and it is hoped that the sketch of the improvements which have taken place within the last twenty years, will serve to show that these are very impor-

* It was suggested that a prize should be offered by the Council of the Royal Agricultural Society for the best and most economical adaptation of steam to existing buildings for drying hops.

† Mr. Rutley on the Culture of Hops, vol. ix, part 2, Journal of the Royal Agricultural Society.

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tant and well worthy of honorable mention in the records of general agricultural progress.

No doubt the progress in the next twenty years will be much greater, as the Council of the Royal Agricultural Society of England have decided to offer special prizes for implements and machinery calculated to improve and cheapen the production of hops; and hop-growers themselves seem determined to use their utmost energy and skill to raise the standard of the English growth, and to drive the "foreigner" from the field.

REPORT ON SCAB IN SHEEP.*

By HUGH BORTHWICK, Shepherd, Middlestead, Selkirk.

Among the diseases of the skin British sheep, especially Scotch, are subject to, the scab stands predominant in frequency of occurrence, deterioration to the wool, the flesh and the thriving of the animal, and if allowed to gain to a footing amongst a flock of sheep, and means are not taken to arrest its progress, there is no disease sheep are subject to that spreads with so ruinous effect, both to the flock and flock-master. It attacks young and old, from the suckling lamb of fourteen days to the aged dam of six years old. Its ravages are as severely felt amongst the hardy black-faced breed of the Highlands, as among the more tenderly constituted breed of the Lowlands; in fact, there is no variety of breed, age or condition of sheep able to repel its attacks. If it has fairly gained a footing amongst a hirsel, the contagion is communicated in a more or less degree, according as sheep come in contact with each other. Thus the disease spreads more rapidly amongst a flock of sheep grazing in parks than on the wild and mountainous ranges. Scab in sheep is something akin to itch in the human being; and amongst flock-masters of experience and good management it is looked upon with the same abhorrence in the sheep as a family of human beings affected with this disease are viewed by every individual they come in contact with. Itch in the human family that has existed for any length of time is denounced by the highest medical authority as the result of ignorance, indolence or sloth, and the acute practical stockman does not hesitate to apply the same reprehensible language to his neighbor who allows his stock to be overrun with scab. These are strong assertions, but they are no less strong than true. There is no doubt scab may, and does occasionally,

* From the Transactions of the Highland and Agricultural Society of Scotland.

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break out amongst the best managed flocks, but it is always imported, or the result of having come in contact with diseased animals; but I have never known it to spread to any extent if the proper cure is applied with alacrity, which I will afterward endeavor to prove.

The symptoms are easily recognized. In the first stage of the disease a sheep is observed to bite or pull with its teeth a few fibres from the wool. Consequently a spot of a whiter hue is observed than the general color of the coat, and is commonly termed "flowering" by shepherds. As the disease advances the animal becomes very irritable and uneasy, rubbing itself against every projecting part of a dyke, post or earthen bank that comes in its way, and tearing off the wool with its teeth from every diseased part of the body it can lay hold on. By degrees the skin becomes hard, large patches of scab are formed, and the wool comes off in considerable flakes; the animal loses condition rapidly; no amount of liberal feeding will sustain it. On the contrary, it has rather a tendency to aggravate the disease, and sooner or later the animal falls a prey to the tormenting disorder, a distressing spectacle of the negligence and inhumanity of the owner. If sheep are first attacked with a scab on part of the body where neither its mouth nor feet can reach, the symptoms may for a time pass unobserved; but generally an uneasiness will be recognized before the disease spreads to any extent. No definite period can be stated how long a sheep will sustain life under the disease. A good deal depends upon the constitution and condition of the animal when attacked; also upon the period and state of the season, at least upon hill pasture. For example, if a sheep is affected with scab in the end of the year and means are not taken to cure it, if the winter is stormy it runs a great risk of dying of poverty in the spring. A strong proof of this fact came under my own knowledge in the severe winter and spring of 1860 and 1861, in the county of Mid-Lothian, where a hirsel of sheep, numbering between 400 and 500, had been affected with scab for some years previous, no effectual means having been taken to eradicate the disorder, and by the month of May, 1861, only about forty remained alive.

It is asserted by some writers of high authority, that scab assumes different forms in different seasons; the only forms of the disease in the south of Scotland that have come under my own observation have all a striking resemblance. When the animal is examined in the first stage of the disease, where it has been scratching or biting off the wool with its teeth, small red pustules or pimples are observed, the skin feels hard to the touch, and if scratched with

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the fingers or any instrument the animal exhibits a remarkable uneasiness, chacking with its teeth, and will even seize the operator and bite severely; and at no time, either in health or laboring under any other disorder, will a sheep attempt to bite a human being except when suffering from scab. By degrees the pimples spread over the body, the skin becomes rough and hard, an extensive eruption ensues, large patches of crust or scab are formed, which increases over the body, and ultimately the animal becomes exhausted from continual suffering or dies of poverty by the perpetual irritation. I have never had any experience in the *post-mortem* examination of scabbed sheep, consequently can give no minute account of the appearances from my own observation; and, as I have already hinted, there ought to be no deaths of sheep from scab, as it yields readily to treatment, and a *post-mortem* examination is either the result of ignorance or negligence, or allowed to take place to derive information.

Youatt describes the appearances as very uncertain and inconclusive. He says there is generally chronic inflammation of the intestines, with the presence of a great number of worms; the liver is occasionally schirrous, and the spleen enlarged; and there are frequently serous effusions in the belly, and sometimes in the chest. There has been evident sympathy between the digestive and cutaneous systems. Several of these appearances, however, are observed in ill-nursed lambs and old sheep dying of poverty, although free of scab. In the former, the intestines are often invaded with worms to a great extent, and water is found both in the belly and chest; whereas, in old sheep dying of poverty, water is very often in the chest. I once slaughtered a strayed sheep affected with scab, to prevent the disease from spreading amongst the flock I had the charge of, and found no trace of disease internally; all the organs were apparently healthy; the animal affected, however, was in the first stage of the disorder.

It is clearly ascertained by scientific men that the scab in sheep, like the itch in the human being, is connected with and propagated by certain minute insects belonging to the class of acari, which inhabit pimples or pustules. But the question naturally arises, how came they first into existence? This problem is very difficult of solution, and puzzles the most eminent physiologists. But, as I have already said, I have never known it break out spontaneously amongst a flock of sheep properly managed, during a period of thirty years experience as a shepherd in pastoral districts. This fact alone, I think, is conclusive proof that its origin must be sought for in mismanagement. To show what kind of mismanagement is most liable to produce the dis-

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ease, I will quote the authority of my late employer, Mr. Gardner, who was at one time and for many years a large flockmaster in Australia, where the disease prevailed to a great extent. Amongst settlers in Australia the idea was common that when sheep were heated by being overrun with dogs, and being huddled close together into folds all night, as was the custom in the colony, the heating and over-crowding, combined with the fold at times getting foul or dirty, had a great influence in producing the disease in that warm country.

Mr. Gardner, however, states from his own experience that he generally could trace scab amongst his own flock to have been communicated from buying sheep affected with scab, or having come in contact with some neighboring flocks so affected. Nevertheless it is quite evident that over-heating or over-crowding in folds, especially the latter, has a tendency to bring on disease of the skin. A strong proof of this fact came under my observation on several occasions. It was the practice on the farm of Traquair Knowe, for several years, to draw from the stock a few of the worst conditioned and unthriving sheep in the month of October, amounting from ten to twenty in number. They were generally confined in a small inclosure, well sheltered, and fed off for the butcher on cut turnips, corn and hay. They were allowed to remain white, that is, no dipping or smearing was had recourse to, and in the beginning of the spring of each year, an unusual eruption broke out on the skin, and although it could not be termed scab, still the wool began to fall off, and there was a certain irritation or itch about the skin which prevented the sheep from feeding, and they had always to be sold off in the course of three or four months after the feeding had begun. It may be argued that the want of dipping or smearing was the cause of the eruption on the skin. This however, was not the case, for amongst the rest of the feeding sheep, also undipped or unsmeared, varying in number from five to twelve score, inclosed in a turnip field and fed in the same manner, nothing of the kind ever appeared on the skin although fed for a longer period. Thus I think it is clear that confining sheep too close is injurious to the health, and has a tendency to bring on disease of the skin, and may, if persisted in for any length of time, combined with other causes of mismanagement, produce scab, and in this respect it only follows the laws by which other diseases are governed, and are produced in a great measure by neglect or mismanagement. For example, sturdy in sheep, the hydatid in the brain of sheep, is a parasitical insect propagated in a great measure through improper nourishment and shelter of the animal. Mr. Gardner states that moist,

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showery weather had a great influence in spreading the disease. When the weather had been dry for a long time only slight symptoms were visible amongst the flocks, but when it changed into soft and frequent showers, the disease spread with alarming rapidity. This fact is easily explained. If the acari are newly hatched and kept dry, they die in a few days and crumble into dust; the same fact may also be recognized in the maggot. If the fly deposits its eggs on the wool in very dry weather a great many perish; but if the atmosphere is soft and warm, they spring into life with amazing rapidity, and multiply exceedingly. As I have already said, I have never seen scab arise spontaneously; it was always communicated from sheep to sheep by the coming in contact of the sound animal with the diseased.

The following are a few of the examples that have come under my own observation: In the back end of the year a sheep having strayed from a drove that had been bought at Falkirk, and after passing through a great many stock-farms, took up its abode on one of the farms in the high pastoral districts of Peeblesshire, and although it had been often observed by the shepherds, no particular attention was paid to it, as it is an event of frequent occurence. In the course of a few weeks the animal was observed to be drawing the wool off with its teeth, and when it was caught and examined, the body was found to be affected with scab to a considerable extent. The sheep was instantly destroyed, as the owner was not known. But in the course of six weeks several of the sheep belonging to the hirsel where the diseased sheep had taken up its abode, showed symptoms of disease. They were instantly taken home and dressed. Also, every sheep belonging to the cut or lot that grazed together, and it was considered that effectual means had been taken both as to the cure and the preventative. But in the spring of the year the disease broke out anew amongst several of the cuts or lots of the sheep in the hirsel, and, after several unsuccessful attempts, the disease could only be eradicated by dressing the whole flock, both sound and diseased.

Buying in diseased rams is often a fruitful cause of spreading the disease; and as the insect at a certain stage remains dormant, and baffles the most acute eye to detect its presence, still it retains life from autumn to spring. A circumstance which shows that the most practical stockman may purchase scabbed sheep unawares, of which the following is a proof:

A farmer in Peeblesshire bought four Cheviot rams in the month of September, and after being brought home, rumours were whispered that scab had been prevalent amongst the stock from which they had

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been bred. This led to the rams being minutely examined, and no trace of scab could be recognized. They were put to serve hill ewes in the month of November, after passing another careful examination, and passed as sound. But in the course of a month, two of them showed symptoms of scab, and upon examination, it was found the disease had clearly manifested itself. The four rams were immediately taken in and dressed; but in the month of January several of the ewes were affected. The whole hirsel was subjected to a minute examination, and although a very few were slightly infected, the whole were dressed, and the disease at once disappeared. This shows the great importance of applying a cure as soon as the disease is observed, and of dressing every sheep that may have had an opportunity of coming in contact with the diseased ones. To illustrate this fact, I may relate the following which occurred on a stock-farm not far distant from the last mentioned, and where scab was communicated to the ewe from buying in diseased rams, and where, also, no disease could be traced on the animals at the time of purchase. They were put to serve the ewes at Martinmas, and were brought in at the New-Year, and put on liberal feeding, and in the course of a few weeks the disease manifested itself. Scab broke out among the ewes by the middle of February, and those that could be recognized by sight or showed symptoms of disease only were dressed. The cure, or rather what may be termed no cure at all, was continued in this half measure for a year, till not only the whole hirsel had become effected, but the disease was communicated to the flocks of three adjacent farms. In this case, had not a strict inquiry been made, the disease might have been said to have arisen spontaneously. This, however, was not the case, for it was clearly proven that scab had existed amongst the flock from which the rams had been bought, and at the time of sale the sheep were not thoroughly cured.

Various and conflicting opinions exist as to what extent the disease is infectious. Some affirm that it requires sheep to come in contact with the diseased before it can be communicated; whilst others maintain that the disease is propagated by the mere travelling on a road, such as a public drove-road, from large markets or fairs. I, however, do not think the disease so catching as the latter advocates affirm. For example, I have acted as shepherd for sixteen years on various farms, where the drove-road from Falkirk to the south passes through the sheep pasture, and every year some of the lots of sheep were more or less affected with scab, and during all that period not a single sheep of which I had charge caught the disease. Strict

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measures were always taken to prevent intermixing, but the sheep were always daily passing along and crossing and recrossing the road through which the scabbed droves were driven.

A stronger proof than this, that scab is not so catching as some affirm, may be deduced from a neighboring farm, where the drove-road from Falkirk not only passes through the sheep pasture, but it is what is termed a stage from the market to the south, that is part of the regular sheep pasture is usually let for sheep and cattle to stay all night on, and not a single sheep on the farm was ever known to catch the disease. The ground set apart for letting to droves is very high and exposed, and is free of dykes or rubbing-posts, and is eaten bare, and rendered foul by the droves; and, consequently, no inducement is left for the sheep on the farm to pasture on that particular space for a time. Nevertheless, they are daily crossing and recrossing, which, we think, is sufficient proof that the disease is not so catching as some affirm, and that it requires sheep to come in contact with the diseased animals, or a longer period of time than a single night for the acari to be deposited on the pasture or any projecting substance, so that it may be communicated to sound animals. I think this fact illustrates a very important point, regarding which a great discussion has arisen of late in the cattle disease prevention bill, namely, to what extent scabbed sheep ought to be allowed to travel publicly; and I think it will appear quite clear that if scabbed sheep are driven straight on the public road, without coming in contact with sound animals, there is no danger of the disease being communicated; and it is a fact yearly experienced among dealers and drovers, when buying sheep in the Highlands to bring south, that although no scab can be detected among them at the time they are lifted, still after a drive of several weeks, before they get to their destination, the disease frequently breaks out; and I have never heard the origin of the disease attributed to the driving, but the irritation, and sometimes over-heating, only tends to rouse into action the latent germs of the disorder which manifests itself more early than if the sheep were allowed to graze at their own leisure. Then, in these cases, if a lot of sheep were stopped on their road homeward, a case of great hardship and difficulty would occur, which the most acute dealer could not avert nor foresee, and the danger of spreading the disease would be increased tenfold more by the lot being stopped at some station than if they were allowed to pass straight on.

There is no doubt that railway traveling is a very different question and a very fruitful source of spreading the disease. For example, if

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a lot of scabbed sheep were placed in a truck and conveyed for several hours, and, when taken out, if a lot of sound ones were put immediately in, which sometimes occurs, great risk is run of catching the disorder. To illustrate this point, I will relate the following fact: On a farm in Mid-Lothian, already alluded to, where the disease prevailed to such an extent, no fences or march dykes existed between it and several of the adjoining stock farms, and from the shepherds paying particular attention in keeping the sheep from intermixing, the disease for some years never spread to any extent. Still, there was always a few catching the disorder. To obviate this, and the constant care and trouble of the shepherds, one of the adjoining tenants put a paling along the boundary, on the top of the hill, between his sheep pasture and the farm, where scab prevailed. Instead, however, of the fence having the desired effect, it was exactly the opposite, and the disease spread and increased to a far greater extent. The reason is plain, and can be easily explained. Sheep naturally draw to a hill top at night if the weather is mild. Consequently the paling served as a rubbing post, where the diseased sheep naturally drew, to ease their torture, and on which the acari must have been plentifully deposited. Consequently the sound sheep on the other side were attracted by their neighbors, and not only carried off the acari, but the wool of each came in contact through the bars of the paling, so that the disease was transferred from sheep to sheep. Thus, in a similar manner, scabbed sheep conveyed by the railway is a more fruitful source of infection than traveling on open road.

Cure of scab undoubtedly lies in the destruction of the insect, but the important question is: What is the best composition or infusion for that purpose? The remedies that are commonly applied are numerous, but the most effectual, with the least danger of injuring the animal, that ever I have seen applied, is the common spirit of tar, and, if properly applied, will penetrate and destroy the insect concealed in the pustules, or buried beneath the skin. The quantity applied may vary according to the condition and age of the sheep, but for hill or ordinary breeding stock one bottle of the spirits of tar mixed with twelve times the quantity of water is sufficient for twelve sheep, or one common glass of the spirit of tar mixed with a bottle of water is sufficient for one. But if a large number of sheep required to be dressed, a quantity of liquid, or as much as will dress a hundred sheep, may be mixed at a time. If mixing for a hundred, six gallons of water, with six pounds of common soda, ought to be warmed to the boiling pitch; then add the spirit of tar. The soda acts as a chemical

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substance to combine and thoroughly mix the spirit of tar with the water. Without it the spirit of tar will not intermix with water. Afterwards fill up the mixture with cold water to the quantity required. The operation ought then to be conducted in the usual way of pouring, but with a great deal of more time, care and attention. The shepherds sheds the wool, and a boy or girl, with a small tin dish, in the form of a coffee or tea pot, but a great deal smaller at the outlet, measures out the exact quantity for each sheep, and pours out the liquid slowly, following up the furrow behind the shepherd's hands. The sheds ought not to be above one inch apart, so that the skin of the animal may be thoroughly examined, and wherever the scab has got into a hard crust a blunt instrument or knife ought to be used, to scarify or scratch off the scab, to enable the liquid to penetrate more easily. The shepherds ought also to have a quantity of the pure spirit of tar on hand. If the animal is badly diseased about the hind quarters, particularly about the tail or thighs, or even about the forearms, he may apply the liquid freely, and rub well in with the hand. There is little danger of injuring the animal on these parts. I have put four glasses of the pure spirit of tar on one sheep, without any injurious effects. But great caution ought to be used about the shoulder, and above the kidneys, and nothing but the mixture ought to be applied to these parts. If a sheep shows symptoms of having got an overdose by staggering a little, which it will do in the course of about fifteen minutes if such is the case, a pitcher of cold water poured along the back and shoulders will give immediate relief, and is an effectual cure. There ought always to be two apartments for the dressed sheep. As I have already said, a cure cannot be relied on without dressing the whole flock where scab breaks out, so that when the shepherd finds the least speck of disease on any animal he ought to put it in one apartment, and the clean or apparently so, into another. The latter may be turned to their former pasture when thoroughly dressed, but the scabbed ones must be kept separate for ten or fourteen days, and then undergo a second dressing, even although the disease may appear entirely subdued, as the first dressing cannot always be relied upon as an effectual cure. They may then be turned out to join the rest of the flock, and I have never known the disease break out afresh under that treatment.

I have cured two lots of hogs* seriously affected with scab in the manner described. The first lot was bought of a dealer in the month of October, and after being brought home and put on a second crop

* A *hog*, or *hogget*, is a yearling wether.

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of clover, they showed symptoms of scab in two weeks, but no means were taken to arrest its progress for two months. Application was then made to the dealer to get them returned. He refused on the ground that the application ought to have been made as soon as the disease appeared; and there was no doubt the owner made a mistake on this point, as he had allowed the whole lot of hogs, amounting to a hundred, to become affected, and a good many had lost condition. I was asked by the owner to try and effect a cure, and use any application I considered best. I consulted an old shepherd I knew had a great deal of experience amongst scabbed sheep, and he advised the above remedy, namely: spirit of tar. I dressed every hog. Those that were badly diseased I applied an extra dose of the pure spirit of tar. I instructed them to be turned into a clean pasture field for fourteen days, and although the disease at that time appeared to have been subdued, I dressed the whole lot again. The hogs were clipped during the summer, and fed on turnips in the winter, and no symptom of the disease ever appeared.

The second lot of hogs was also bought from a dealer, and had been three times returned on his hand for being scabbed. The dealer asked my employer to buy them. This he agreed to do at a price much below the original cost, and on condition that every sheep that died of dressing was at his loss. They were greatly reduced in condition, and the wool was falling off in large flakes. I applied the same remedy, but I was instructed by my employer to make certain of a cure, although I killed a good many; consequently, to every hog that was badly diseased, I applied the spirit of tar liberally, putting as much as four glasses on some animals. A good many of them sickened and staggered a few minutes after being dressed. I at once applied the cold water which was an immediate cure. After fourteen days I dressed the whole lot again, which was in the month of January; and at the term of Whitsunday, when I left, they remained quite clean, and in thriving condition. I never had an opportunity of seeing them again, but, upon inquiry, I was informed they were fed off on turnips during the following winter, and no symptoms of the disease again appeared.

It will be seen, however, that these experiments were conducted upon sheep that had only been for a comparatively short time affected with scab; and, from my own experience, I cannot say how the cure would succeed with a flock of sheep, where the disease had existed for years, and consequently, the ground had become foul, and liable to communicate infection.

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I take the liberty of quoting, on the authority of a friend, an experienced shepherd, who was engaged a good many years ago to superintend a large stock farm in the Highlands, and where scab had prevailed amongst the flocks for many years previous. He states he bathed the whole flocks twice with the spirit of tar. Afterwards, in the month of November, he smeared the whole heavily with the usual mixture of tar and butter, which effectually eradicated the disease. But, he adds, although the cure of scab in a large stock farm entails a great deal of trouble and expense, it can be accomplished. But whilst stock farmers are not all equally zealous in keeping their flocks free of scab, the great difficulty is how to prevent it. Whilst sheep are newly poured with the spirit of tar, or heavily smeared with tar and butter, there is no danger of them catching the disease from coming in contact with scabbed sheep; but it is no uncommon occurrence and very mortifying, after your whole flock is thoroughly cleaned and clipped, for a strayed scabbed sheep to find its way among your own; and in these mountainous, wide districts, it may have taken up its abode for weeks, or perhaps months, before it is discovered, consequently a fresh outbreak of the scab is the result.

To corroborate this statement, Mr. Gardner states his experience in curing scab in Australia. When he first went out and commenced stock farming, scab prevailed almost generally throughout the colony, and it was the greatest pest and difficulty sheep masters had to contend with. No sooner had he got his flock cured, than they caught the disease afresh, from coming in contact with some more indolent neighbor, who allowed his stock to be overrun with scab. At length stringent laws were passed, inflicting a heavy penalty on every stock-master who allowed his sheep, if scabbed, to come within a mile of his neighbor's boundary. Mr. Gardner then saw there was a possibility of eradicating the disease. His flock at that time amounted to upwards of 10,000, and the disease was spread throughout the whole, which was certainly a very formidable task to attempt to cure. Clipping time was the period selected for the operation. After every sheep was stripped of its wool, three men were appointed for each sheep, which was thoroughly dressed with an infusion of tobacco and sublimate of mercury. All the sheep that showed the least symptom of disease were kept apart by themselves, and underwent a second dressing in a few weeks. In the course of six months the whole flock was clipped a second time, a system which was practised in some of the districts of Australia at that time, clipping twice in the year. Mr. Gardner dressed his whole stock again, putting them through the same process; and whilst

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he resided in the colony, which was for several years, a scabbed sheep never was seen amongst his flock; a very important fact, and a demonstrative proof, that scab amongst sheep can be totally eradicated, even although it has been of several years standing. "Thus," says Mr. Gardner, "in the course of six months, after a great deal of trouble and expense, I got rid of the most troublesome disease that can affect sheep. But the trouble and expense were doubly repaid in the same space of time. The stock fed a great deal better, and the wool was of more value; and, instead of being compelled to pay a shepherd for every 600 sheep, to keep scab in moderation, I put under one man's charge 1,600 sheep, and found he could manage the latter number with more ease and satisfaction than he could formerly the 600 when scab prevailed; and I was enabled to live, myself, in comparative ease and quietness. The quantity of liquid applied was one ounce of the sublimate of mercury mixed in two gallons of water, and a few ounces of tobacco boiled, which was sufficient for twelve sheep." Mr. Gardner adds, that the mixture was attended with a good deal of danger, and, in general, a good many died after the operation, especially if allowed free access to water. They drank greedily in that hot climate, and doubly so after the operation; and, when allowed to do so, a severe swelling took place about the head, and death was generally the result. But when the operation was conducted with care, and the sheep kept entirely free from water, the loss was trifling.

The loss resulting from dressing scabbed sheep with the sublimate of mercury in Scotland has at times been severe, and has led generally to the disuse of it. There is no doubt a more powerful substance cannot be used for destroying the insect, but it is often attended with injurious results to the constitution of the animal. And there is no doubt the spirit of tar is a safer and equally as effectual a cure. The only objection to its use is staining the wool, and a good reduction of price is sometimes experienced at the time of sale. This, however, is certainly the least evil, and can be remedied to a great extent. For example, if a flock of sheep has to be poured twice with the spirit of tar, there is no doubt the wool cannot be sold at a high figure for white; but, again, let the sheep be smeared with tar and butter, and sold for laid wool. The extra weight, in a great measure, counterbalances for the high price obtained for white wool; and the smearing serves a double purpose; it acts as a safe and an effectual cure for scab, where the disease has been of long standing, if the sheep have been dressed with the spirit of tar previously. Indeed, some men of great experience maintain, that a mixture of tar and butter, properly

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laid on sheep, will effect a cure of scab in sheep, in whatever stage of the disease. And I am informed by a large English dealer and grazier, who has bought annually, for the last twenty years, at Falkirk, from fifty to eighty score of sheep, that during that period, with the exception of one year, scab always broke out on the way, or shortly after his arrival home, and the only cure he applies is smearing with tar and butter, and he never has had to apply the cure twice to the same animal; but he adds, the great secret of success lies in the shepherd or operator paying attention that no part of the animal is missed. Fifteen sheep per day is all that the most proficient hand can accomplish. Thus, we think, it will appear clear, when scab has existed for any length of time, smearing with tar and butter is an essential application, after dressing with the spirit of tar.

As I have already said, I have never seen or known the disease break out spontaneously amongst sheep; and I am firmly impressed with the idea that, if cases do occur, it is the result of bad management, such as overcrowding, overheating, or the want of bathing annually, especially the latter. For example, about thirty years ago, when smearing with tar and butter was the general practice, it was the common belief that sheep would not live during the winter without being smeared once a year, at least they were certain to become scabbed. So prevalent was this idea, that when an enterprising stock-farmer in Peeblesshire commenced pouring his flock with an infusion of arsenic and water, to obtain a higher price for his wool, he was looked upon by his neighbors with dread, as they considered he was certain to produce scab in his flock, whereby they were sure to catch the disorder. After a successful trial of some years, almost every stock-farmer followed his example, and some ran to the opposite extreme, and kept their sheep in a natural state without applying any composition whatever; but the vermin, such as tick, kade and lice, increased to such an extent that a kind of itch or scale appeared on the skin, which prevented the sheep from thriving, and the owners were compelled to have recourse to some kind of composition to pour or dip their flocks with annually. Although the itch or scale could not be termed scab, still, if their flocks had been allowed to run "white," as it is termed, for years, the result might have terminated in scab; and there is no doubt that bathing or dipping once a year with some kind of composition is a safe preventative.

The great drawback in dipping compositions is the poisonous ingredients they are composed of, and many practical stock-owners consider they weaken the constitution; other stuffs can, however, be

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obtained free of poison, and equally as good for destroying vermin. Mr. Gardner, Traquair Knowe, has been in the habit for many years of bathing his sheep annually with a mixture of rough turpentine and butter, and has found it more effectual in destroying the vermin than any of the common dipping mixtures in use, and being of an adhesive nature, it mats the wool together, which tends to keep the animal warm, and has no injurious effect whatever, but, on the contrary, it promotes the growth and quality of the wool. In proof of this, Mr. Gardner has been in the habit for some years of sending his wool to the Leith sales, and for three years it brought the highest price for white Cheviot wool.

Although it is a point generally conceded by practical stock-owners that scab will not break out spontaneously in sheep if properly managed, still it is equally as clear that scab abounds in certain districts. Thus an important question arises. How is it to be prevented from spreading? For whilst no law exists to compel negligent stock-farmers to clean their sheep; it is clear that the most careful and cautious run great risk of their stock catching the disease, especially those that buy largely at markets. So much is this the case, that I am informed by a large stock-farmer and dealer of thirty years' experience, who is in the habit of buying annually at Falkirk, that for many years scab always broke out amongst some of the lots he purchased after they were brought home, and even spread amongst his home-bred stock by coming in contact with each other. To prevent this evil, he has been in the habit, in latter years, of pouring every sheep he purchased at Falkirk with the spirits of tar immediately on their arrival home, and every sheep that shows the least symptom of disease is kept apart and receives a second dressing. Thus, although a great deal of trouble and expense is incurred, it is the only sure preventative for the disease spreading. Although this is a successful preventative in bought-in stock, a more difficult point presents itself; for example, scab is allowed to prevail amongst a stock of sheep in some of the pastoral districts where there are no march fences, and where the flocks on various farms are daily intermixing. In such cases it is a matter of impossibility to prevent scab from spreading, and the only remedy is to get a law to compel the owners of the diseased sheep to get them cured, or to keep them apart from neighboring healthy stocks under a severe penalty. If some stock-farmers are so careless and negligent as to allow their stocks to be overrun with scab, there is no reason they should be allowed to bring trouble and expense on their neighbors; and until some strin-

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gent law of this nature is passed, scab will never be totally eradicated from amongst our sheep. But if stock-farmers and graziers were all alike anxious to get clear of the disease, and apply the proper cure, it might be eradicated from amongst the flocks of Great Britain in twelve months.

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AMERICAN GRAPE CULTURE.

By S. J. PARKER, M. D., Ithaca, N. Y.

Early in the history of the recent attempts to cultivate largely the American varieties of grapes, the writer of these pages began a series of articles, with the desire of giving an unbiased account of the progress of that event, which, though small in some respects, is yet large in another view of it, viz., the aggregate of our grape wealth. He has no reason to complain of the almost unanimous favor with which these documents have been received. It is true that he has met with the most implacable hostility of a few, interested in the sale of some varieties, whose value he has ever conscientiously doubted; and to whose money-making schemes he has ever refused to listen. But in the end he has the satisfaction of the knowledge, that his main positions have been and are sustained, and the good will of thousands expressed to him. Ill health has broken off this series of articles, as well as stopped his own active efforts to improve our native grapes. But with somewhat returning vigor, he proposes to complete, though perhaps imperfectly, what he otherwise would have said; his only contributions to our grape knowledge of late, being numerous articles in our agricultural periodicals, and replies to an extensive correspondence.

The main idea, started before he was born, was, the now universally accepted fact, that no foreign grape could be successfully cultivated out of doors, without glass, east of the Rocky mountains. That we have rude and almost intractable germs scattered over our vast national domain, of what might be good grapes; that in the wise selection, and, if possible, the improvement of these wild germs, lay the true path of American grape culture. Upon the recognition of these two facts depends all that has, and so far as we can yet see, almost all that can be done toward the accomplishment of the object. To my more youthful eye the task seemed plain and easy. For there were, first, the chance seedlings to be tried; second, the planting of scores, hundreds and thousands of seeds, and the deflection to the better of them, by artificial treatment. Then, the crossing of fair

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native varieties upon each other, as well as of foreign pollen upon the natives; and, finally, the recrosses of these on each other; and I may add, judicious selection and a life-long seeding and reseeding of those kinds of foreign grapes that show some endurance of our climate. Clear as has been my mental vision of all these ways, and though I so fully recognized the difficulty of their accomplishment, that I, years ago, intimated that I wrote for the future, not of what I should ever see, I yet more and more realize the long and painful tasks of waiting, hoping, experimenting, in an age when patience, toil, and future expectation are not appreciated virtues.

The first of these plans, chance seeding, either of nature or art, was years ago understood by men who have forgotten it, as well as by the National Department of Agriculture, and some 200, or thereabouts, of native and accidental vines were gathered and sent out for trial. There are those besides myself who can say we have fruited 100 to 150 at least of these, more or less, promising native varieties. But the reader will easily see that to expect that any private individual can really demonstrate in a lifetime the real value of more than one or two of these varieties is a simple matter of impossibility. All one can do is to say that "I have tested them in the condition in which I received them, and condemned all except a few. I am trying to improve a few. I cannot say what might be done with the others." My own progress, for example, is thus: Maxatawny came to me with the usual overwrought praise. It failed to ripen for six years. Now it always ripens, yet never equals its first announcement in flavor, and is too small to be highly esteemed for general cultivation. Yet who shall say that it is not a germ, which, if properly seeded, will not give us a fine white grape? So of a large number of experimenters, whose labors are not yet rewarded.

As to national experiments, no one more values than I what the agricultural department does. Yet so small are its grounds, that were they all taken up with grape vines and all its laborers put on this one specialty, it could not do it justice. With the national capital removed westward, as in due time it must be, and as all far-seeing citizens desire it to be, and with the possession of suitable land for experiments on a scale worthy of our national character, we may expect results worth attention. All really yet done is the commendable diffusion of vines.

In view of these facts, both public and private, as to what is being done, the field of possibilities opens largely, while we must deeply lament that there is now being executed no consistent and well planned

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method of pursuing what might and ought to be accomplished, except what is done quietly in private life. As to the second plan of improvement, I am glad to say that several American citizens have seeded hundreds, and a few, thousands of plants. The minute details of their efforts would make quite a chapter in our grape history could they be had. Of these, Mr. Bull, of Massachusetts, claims that out of hundreds of intentional seedlings came the Concord, the greatest yet, in general esteem, of all American grapes; not because it is the best in flavor or for transportation, or for its wine (for in all these it is very faulty), but because it is a rampant and a successful grower almost everywhere. We have challenged Mr. Bull to give us something more than the dry, political-platform-like statement he has made of how the Concord was originated; and we repeat the challenge because he has not yet satisfactorily answered to the public. We have only the same meagre assertion, that the Iona came of thousands of seedlings. The details of these experiments would be an acquisition to our grape knowledge. Another experimenter, at Philadelphia, began the seeding of many thousands of vines, but reverse of fortune blotted most of them out of existence before being tested. Each and all of these have, however, done great service to American grapes. I cannot now, as I gladly would, name all such seed-planters as Arnold, of Canada West; Miller of Pennsylvania, now of Missouri, and Thompson, of Green Island, near Troy, N. Y., who seems to deserve commendation, and whose grapes are being quite fully proven. There are thirty or forty of these grape enthusiasts, who deserve the thankful tribute of an inscription on the roll of the honorable in efforts to move on the grape world. For ten years yet to come it will be premature to say what is the real merit of these men. For one, I believe no sin of the American people is so great as the thoughtless honor we give to success or reputation. We cannot have any merely respectable men. They must be heroes or unknown. So we catch a name and extol it to the seventh heaven of praise, and coldly neglect *quiet merit;* yet it is the quiet merit that moves the greater mass of toil.

The third plan of improving our American grapes, in the order named on a previous page, is that of the infusion on native pistils of the pollen of the anthers of other grapes. Now, nothing is more plausible to the susceptible mind than this idea, that the acid, acrid virus, so to speak, of our wild vines can be cured by the sugared, melting sweetness of other vines; that the hard rubber-like pulp can be subjugated by a soft, meaty pulp; that the bag of often characterless juice in one grape will have the infusion of the zest of

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strong flavor of the others. Plausible as is this expectation, we fear that its accomplishment is an uncertain and wearisome task. Iona or Catawba, crossed, does not give the great American grape, because all our red grapes are disposed to rot. Delaware on Ontario has at least a few times failed. Yet there is good reason to think that native crosses have been made that are valuable, however the assertions of certain parties may be mistrusted as to the crosses they allege they have made.

As to the fourth method of improvement, that of the introduction of foreign pollen on the stigmas of our native pistils, we think the atmosphere does not clear up by time. For certain statements of our incipient grape history are made, that this was done as early as the days of Col. Adulum, of the District of Columbia; even the Catawba has been claimed as the result of a cross of the foreign pollen, by him, on the red grape of South Carolina. These early efforts, like the later ones, have been singularly destitute of that result that would seem to belong naturally to it. Indeed Mr. Rogers seems to be the only one whose line of march was absolute and at all direct, that is, in only one experiment, and that in no manner remarkable or peculiar, in which the extraordinary result was had of forty-five vigorous and changed grapes from forty-five seeds. A result that he has not been able to repeat in as successful a manner since, either by his own crosses or recrosses of the Mammoth or any other grape. Certain it is, that though numerous persons have used foreign pollen on our natives from the Atlantic to the Mississippi, and even beyond that river, no result equaling that of Mr. Rogers of Salem, has been had. I now speak of this one success of Mr. Rogers as a matter of scientific interest, making now no allusion to the character of his grapes. I only ask the reader to note that something in the time, the year, or the manner of execution, did give reason to say, that almost mathematical certainty, and the plainest practical ease, did attend the use of this pollen in his hands at that time. And then, in contrast, I call attention to the feeble and sickly results since obtained, even by many careful operators. Whether does this indicate, as some claim, that not only are methods to be studied but times and seasons, for these are the deciding causes, or that there is something to be learned in the process, or its controling details? As light on this question, Mr. Moore, of Rochester, whose success has been great, claims that he flooded his crosses with pollen; and his theory is, that in proportion to the amount of pollen is the resultant grape. This would imply that in vegetable life, the laws of reproduction are diverse from animal life. If not, the result-

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ant grape ought to be independent of the quantity of pollen, so far as the quality of the grape is concerned. So that if the theory of Mr. Moore is correct, it can bear only on the power to resist mildew, the only evil that prevents the cultivation of foreign sweetness and flavor, so superior to American qualities; and in this, I think he is correct.

I believe that the laws of vegetable reproduction are, in the main, bold, adamantine forms, clear and easily to be known; but the *toneing*, as the photographers say, is as delicate as is the excellent print of a Wilson of England compared with the rough print of the operator who never handles a lens or a chemical correctly. And it is this very thing that causes so many failures in crossing grapes. It doubtless is the present thing to be learned. What are the laws of flavors and of saccharine matter in the grape? For it is easy to get size and vigor in our crossed grapes; but the flavor and the sugar are often wanting, to a degree that has caused thousands of plants to be condemned of both seedlings and crosses.

I suggest that it may be well to question whether the infusion of pollen by a brush on the pistil-stigma of a grape is the best way, or any other violent dusting of it. It seems to me that failures have occurred by this forced work. The diffusion of pollen as minute dust in the air, and thus of minute quantities on the stigma, is the way nature fertilizes. We may not have obeyed her teachings sufficiently.

The fifth method of improvement, as well as the subject of varieties of greatest promise, occupies quite a space in a previous article I have written, and I am sorry to say that the cause named in the first page of this paper has shut me off from those trials of it that I then proposed to make. Nor am I aware that any one in the United States has made the trial of secondary or complex crosses to much extent. Yet with the splendid example of the Muscat Hamburg, in our glass graperies, originated by this process, a grape that as far exceeds the Black Hamburg as that grape did the older European varieties, it is strange that so little has been done to make better crosses of our grapes. Thus I have long desired to fertilize Delaware with Chasselas Musque and then cross the Musk-Delaware thus produced on Miles or Concord; Miles for a very early, and Concord for a large, black, musky (not foxy), sweet grape. But no Chasselas Musque pollen has been at my command when I would have made the crosses. It is true that some of the double crosses I have named have been made, but not with results that need to be reported, unless it be in such an example as in that excellent grape, Rogers' No. 47. As unsatisfactory as is the report I have to make in the concomitant history of our progress in

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American grapes on this and some other points, yet I can, as far as I am now aware, add but little to what I have said on these points.

The next and last method of improving in American grape culture is the reseeding of foreign varieties that seem disposed kindly to bear the climate of our Atlantic and midland slopes. These are but few. They are, as generally known, the French Chasselas or Sweetwater, which easily grows, often even in places so cold that our earliest American varieties will hardly ripen; Miller's Burgundy, a small fine grape, but hardly paying for its care; the Ressling, a German grape, that rarely equals its foreign reputation, and quite a number of varieties not so well known, as for example the Wild Syrian, as distinguished from the large White Syrian; one or two Persian and Caucasian grapes, and a few of the more common varieties of our glass graperies.

The faults of most of these are, that for a few years they grow well, bear well, but fail to endure our pruning and care, or else die out absolutely from climacteric causes. Now the question comes, can we acclimatise them by reseeding, or by reseeding with a very small percentage of native pollen? I hope we can. And at this point I shall make a few remarks on some unfortunate facts connected with this matter. Men of capital, and endowed with the gift of advertising well, so as to win the public ear, are not men of experiments. And men who have not much to lose, and whose money is so very small that it requires their time to get rather than keep it, do experiment more than those who have the means to live easily while they should experiment. And the consequence is, that if a poor man does get what should be a fortune in a new and valuable grape, he reaps not the favor of the grape world, but its kicks and curses, until it is too late for him to make his cash out of it. After he has reaped the bitter biting of the dust, then other men reap *his reward*, and that without even thanking him, much less paying him; for wealthy men appropriate to themselves, without ever dreaming of justice to their authors. Again, I repeat, of all deceptions the world contains, is that of *reputation*, usually. You, reader, buy fruits by reputation; vote for men, not as they are, but by their reputation; you and I are, each day of our lives, duped by reputed success. Not until too late is a false reputation reversed. I make these remarks for two reasons. First, because it is said that we have 2,000,000 of acres planted with American grapes. Now, readers, you know, many of you, that your ten, twenty, two or five acres, you planted, not with kinds *you knew would suit you*, but which you *heard*, or got some paper to *say*, or

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somebody to say were the best. The consequence is, that over a million of our acres of grapes must be changed. We were *fooled by reputation*, to that extent, in our planting of grapes. Second, we rejected many good grapes and good men because they had no reputation. And we all suffer in consequence. As I grow older, I grow weary of this perpetual injustice. Yet the agricultural orator, the political speaker, the holiday lecturer, are ever repeating the living lie, that "merit always wins." It does no such thing. That "truth crushed to earth shall rise again," may be true, but it is at the cost often of immense losses, and when it does rise it is of no use to those who were crushed in elevating it. The dead of an army get no reward. It is too late for them. Do you suppose that the half-educated, self-wise French people, are doing justice to the grape of Europe, when they, age after age, make the Chasselas, or the Common Sweetwater, the great market grape of France? Neglecting as they do other and better grapes, can any one but ask, how shall that nation be led to do better? Do you suppose that we, who are as stupid in many things as they, are doing the best we know how to do in the grape offered us? Are we to fall into the perpetual error of flooding our market with unripe grapes, because we are led on by the old grooves cut for us? Is it best that we set out vines that we personally know nothing of, or rush into vineyards that cannot pay their expenses? Often I pass a vineyard, which at a large annual expense is kept in fine order. I know that it can never return a dollar's reward. Such vineyards I pass by the scores wherever I travel. Is it wise my friends! that any more of you say: 'Mr. A. makes the largest public noise where there is so much smoke there must be fire. I will buy five thousand vines of him. B. makes the next loudest advertisement, I will take two thousand vines of him. Mr. X. is hardly heard, I will get ten vines of him?' I have woven in these remarks because of all histories of ignorance and wrong if fully written out, would be that of American Grape Growing. I have written it too, in part, because there are men who have originated excellent fruits, and reaped no reward.

I have said the above because he who attempts to seed foreign grapes must face directly all the principles of so called "success" in our grape growing, and, probably, in the end, get no reward for his labor. Here let me name an instance. One of our citizens, Mr. Moore, of Rochester, N. Y., originated the Diana Hamburgh, one of the finest of out-door grapes, ripening in good localities, failing in poor locations. Has he ever had, or is he ever likely to get any reward for his labor?

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The homestead of the family has passed out of his hands. On it stood, when I was once there, eighteen or twenty foreign vines, largely infused with American pollen, or American vines largely crossed with foreign pollen; a choice collection. When he visited me he sadly said he had not means to prove them, he was not paid for the cost of them, or his attempts to sell them. And I ask any lover of American grape improvement whether it was a wise and pleasant way to be met by the public? If not too late, ought not some one to get and prove and disseminate these varieties? Perhaps some of them may prove truly valuable to us all. But it will be said this is an exception. Let us examine history and see. Was Major Adulum, the almost father of American grapes, ever paid? Where is the man who originated a grape, and was a poor man, who ever was paid for his trouble? I know of not one, though I know many who have labored and been forgotten. Hence I say that some principle of law, or right in a new fruit, is yet to be found that shall defend these men, and pay them. I am more and more convinced by a long experience with patent matters, that all monopolies are injurious to the public. Some day we will in our anger rise up and abolish railroad monopolies as the greatest of frauds, patent laws as the sources of numberless trickeries; yet if patent rights should be granted for anything, there should be some way to vest in our Rev. Mr. Goodriches, Mr. Moores, and other laborers and inventors in fruits, and other agricultural products, *the right to the results of their invention, skill and mental and physical labor.* And he who opposes this knows that he is injuring the discoverers of agricultural products, men of all others worthy of reward. And, too, it is idle to say that laws cannot be made to defend this class of property. All law is imperfect. Every law grows to its perfection or more perfect state. Were a beginning made in the right direction, the end would be soon attained. Let us then call, in the way the people can, on that *impressible creature of circumstances, a politician,* and the law will be had. And I am also further prepared to say that the loss of the collection of a man without means may be an irreparable national loss, that ought not to be sustained. Yet I have, by the press, published and called, in vain, for aid for this very thing. I also quote the now recognized fact that so far as my knowledge extends, Mr. Rogers of Salem, Mass., has never had the pecuniary remuneration justly due him, though better appreciated than some. He is a quiet gentleman in a quiet business, and has never uttered one word of complaint. His use of foreign pollen laid the foundation of most of what we know on crosses. It is a duty that we owe him that he be paid some-

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how better than he has ever been. Again Mr. David Thompson is a quiet Englishman, who came to this country with high hopes of success. Probably he has but little talent for money-making, as well as successful advertising.

Mr. Thompson has had success in one respect. He has seeded and reseeded foreign and native crosses until he has the finest new collection, of which I have any knowledge, in America. I say this advisedly, and he has done it, too, in the direct disregard of all the success that we have had in grape culture, for he has trodden under his feet our rules, and in spite of them grows his grapes in the open air. He has had no success in introducing his grapes. He may never have any, because they may not grow successfully. And at this point in their history he is very unwise who either neglects and despises or overvalues them. All I now say is, that I would the day of usefully employing the large capital in the hands of rich men had dawned, so far that a compensation could be secured to him, if his grapes to a remunerative degree are successfully grown, and that their trial be fairly made at once everywhere. Such men as these and a few others I could name deserve this at the hands of the able men of the public. For Mr. Thompson, for nearly a lifetime, has gone on seeding and reseeding in face of the disappointment of the highest hopes until he has, as I have said, the best collection of grapes with foreign pollen in them in existence in all our land. So far in advance of all the public know of them are they, that were I to attempt to say what I ought of them, I should again, as I often have been, be met with public incredulity. I do not say that his collection will be a great national benefit, for no one can say that of any undemonstrated fact; but I do say that if he has so seeded and reseeded foreign grapes so that if the varieties called Carpenter, Farmer's Club, Gen. Grant, N. C. Ely, and others that I have eaten, raised out of doors in the open air, will ripen in any large extent of our national domain, then he has revolutionized the grape growing of those sections of our land where they will grow, and that some way should be had that after forty years' labor he be honored and paid.

The principle on which he has founded his seed planting may not be fully understood by him, nor is it sure that I can explain it. But if I do comprehend it, it is: That the cause of mildew in foreign varieties is their greater vascularity over and beyond the degree of cellular sap in the American species; that is, the American, wood, leaves and whole vine, has less sap in them, or is closer knit or set together, than the foreign grape, wood and leaves; and the consequence is that

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certain species of fungus or mildew penetrate to and feed on the cellular tissue of the foreign, which cannot get access to American varieties. And the conclusions thence drawn are obvious. 1st. It is not the degree of cold that destroys foreign varieties, for Black Hamburg, Muscat Hamburg and many others of the choicest of foreign grapes are not frozen to death, but die of fungus. 2d. Foreign grapes grow late in the season. 3d. They fail to do early in the season the maturing of their wood; they do not fail to grow canes, but to do the last ripening of them. 4th. Could we cause these errors of the foreign vine to cease we should be able to have at our doors the unexampled flavor of the Vitis Vinifera. Our grapes are emphatically Viniferas, or wine bearers, as to aromas and flavors, and hence that last name is a misnomer. Theirs are *table fruits* rather, and *edible* bags of sweetness for the mouth.

Now in all acclimation this is to be observed, that there is no such thing as deflection to hardiness and power to resist mildew by the exposure of a plant to cold and mildew. Thus, for example, it is a vain hope to ever expect the Black Hamburg to grow hardy out of doors by mere exposure. What, then, can be done with it? Just this, at the best, and no more. Impress, not on the vine but on its seed, a disposition to less vascularity. Then raise that seed to a plant or vine. If the gain be but a millionth of a deflection, yet it is something. Again plant a second and a third, and so on, set of seeds, each a little gain, and at last the Black Hamburg *in its posterity* may gain a degree of hardiness that shall make it valuable as an out-door grape in many localities of grape growing. It is this idea that I shall defend, as one of the hopes I have of at last obtaining seedlings of foreign vines, or vines with high percentage of foreign pollen, able to fruit in the open air on the eastern slopes of our continent.

Now further, no man will say that he ever saw the identical plants, in any European collectiou, called the Carpenter, Ely, Ellsworth, William Tell, Farmer's Club, etc., of Mr. David Thompson. By going to Green Island, about a mile or mile and a half from one of the principal hotels of Troy, N. Y., he can see these varieties year after year in the open air. And all I can assert is, that it will pay, in my opinion, any grape-grower to cultivate them precisely as Mr. Thompson does. If he can grow them in open vineyard, then it will amply reward him to give them space in his vineyard. And I cannot pass them by with a less notice than this, which I have now given them, and maintain my position of fair, unbiased statements of my observations on promising varieties of grapes. Should my expec-

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tations prove false of them, I shall console myself that, the injury done is infinitesimal to the wrong done by intentional over praise, and over sale of known grapes of less valuable qualities.

Such are the principles and hopes that I believe we may reasonably indulge as to absolute, or nearly so, foreign grapes. But the advance of the times is also in the direction of varieties not such. Let me contrast them. The principle at the foundation of all our native American varieties is, seed and reseed until good grapes are had, and cross moderately with foreign pollen. The principle of foreign grapes is to hope against hope until grapes be had that will endure our climate. He who says that any American grape equals the foreign in flavor, only shows how ignorant he is. Our labor is not yet one-third over. You and I may not see the ultimate American grapes, yet they are slowly and surely coming. New grapes now, must be better than Clintons, Isabellas, or Catawbas. They will be better than our Walters and Eumelans, much as I esteem them. Higher and onward is yet the word for our developing labor. I would be glad to announce the match of the Muscat Hamburg but it has not yet been had; and this is all that I feel authorized to say. I must again repeat to our grape friends, if you do not write to me I cannot know all you are doing. If you would write more freely, and publish yourselves, it would please me better, for it is due to the grape interest that we know in some manner what you are doing. If, too, you do not by the now plain and easy methods of seed planting, cross-making, as well as by stimulating the slow growing, repressing those that grow too rankly, with much and long patience, through disappointment after disappointment, constantly seek after better kinds, larger and sweeter grapes, we shall never have them. In saying this I am not unaware, that as a rule, for example in the apple, there has never been much systematic seeding; that is, intentional improvement. On this, were this the proper place, I would gladly remark. We have found chance seedlings of the apple, that in out-of-the way places were thought to be good. They have been cultivated and diffused. I cannot call to mind one single apple, that really claims to owe its origin to the crossing of the pollen of one apple on another, by systematic effort. The Porter, Newtown Pippin, Tompkins County King, certainly were chance seedlings, as were the Delaware, and the Eumelan. I can account for this want of apple seeding, only by the extreme reluctance with which we undertake long and thought-taking experiments, especially when we know, the chances are against us of success in the nature of the subject, to say nothing of the

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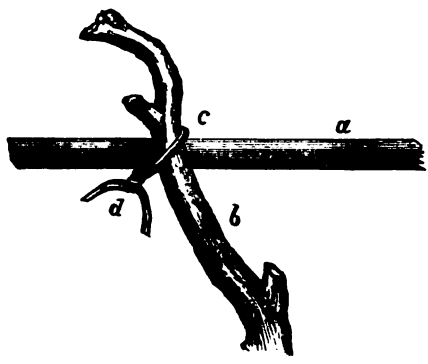
interruption of sickness, the change of residence and other contingencies. And, too, it is American taste, that we rather have some one besides ourselves to do our thinking and planning in fruits, and the toiling work therewith, while we go to the man who tells us in ecstatic words, that he and he alone has the grape of all others, and we be simpletons enough to trust to the *artificial reputation* he has created, not because his grape is so far superior to all others, but because he has cash to make out of us who have acres to plant. A sober, common sense would teach us that, in this, the infancy of our grape culture, we have no universal grape; and that all such representations must be received with the amplest allowance.

Next, let us ask what are some of the contingents to cultivation? One is the use of small wire in place of cord, to tie the vines to the trellis wire. This has been practised for many years past by many, as Mr. Hungerford, of Ithaca, N. Y., and others. A little experience will teach any one how long to cut his wires. Some tie with three inches; others cut the wires six inches long.



The trellis wire *a*, has the cane *b* held to it by the small wire *c*, twisted at *d*, about both. The wires are carried in a bag about the operator's waist, or in a basket containing the pruning apparatus.

As a friend of labor-saving devices, I cannot pass by the vine-lock or vine-tie of my friend Edward F. Underhill, Esq., of Brocton, N. Y., who stands quite prominent as a cultivator of the vine, and as a writer of practical communications on the grape. The next figure shows his invention. In it *a* is a wire of the trellis with *b* a finer wire bent to two hooks; one *b'* is made fast to the trellis wire, where it remains year after year. The other end *b''* is open so as to be

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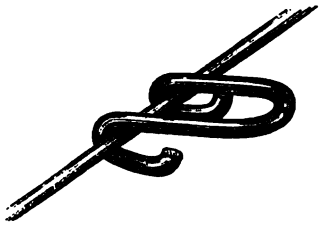
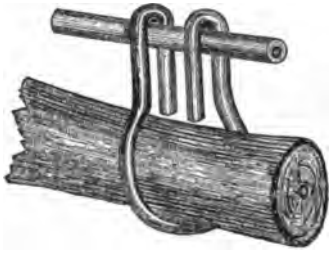


hooked on the trellis wire at pleasure. The space *c* is for an upright cane to be put into as seen in the next figure. It will be seen that a

little experience with this vine-tie is necessary, as indeed is the case with any new article. But it has been estimated that at least three or four ties can be made to one of cord or bass-matting, to say nothing of the expense annually of the cord or bass-mat. Certainly, in the labor of starting a new vineyard the task of tying up the young vines is very great, and any permanent plan is to be commended. The next figure represents one of the ties made for horizontal canes. At



least two other forms have been suggested by Mr. Underhill for this kind of tie. We commend them to the good will of our vineyardists, who can order them of the inventor.

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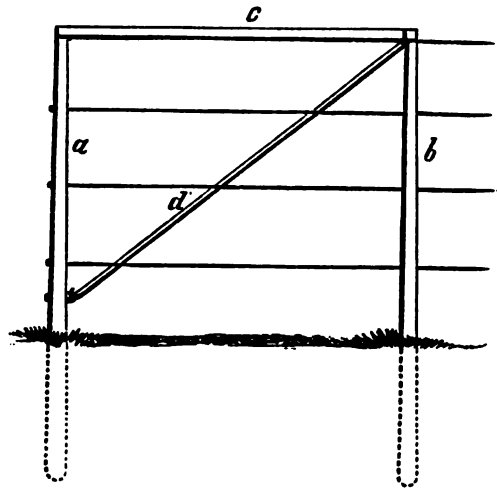
There is one annoyance that a wire trellis ever meets. It is that the weight of the wire and fruit hangs heavily on the post *a* of the figure, so that this post at the end of the trellis bends inward, and



not unfrequently is torn up by winds and storms. To remedy this many plans have been suggested, of which the cut gives one. Posts *a*, *b*, &c., are set at any convenient distance apart, and a piece *c*, is spiked on the top of the posts, two or three of them nearest the end post *a*, which piece is stout enough to resist quite a thrust. A stout wire or small rod *d*, is made fast to near the bottom of the post *a*, and to the top of the post *b*, and to the piece *c*. This makes a stout bracing, and divides the drag on the end post, throwing it partially on the post *b*. It has the advantage of not being in the way of cultivating the soil as would a brace from the ground to the post. Though several forms of trellis have been proposed, as well as of stakes to suspend the vines, yet nothing for ordinary use equals the trellis of wire on posts. The vines we cultivate in the regions of the United States, where rain falls freely, naturally grow much every year; and while a moderate summer pruning, by cutting off the ends of the vines is desirable, I believe the severe summer pruning is not to be commended.

This last remark leads me to say, that A. J. Byington, Esq., of Naples, N. Y., has originated a plan of pruning the vine mainly in the season of its growth. This plan has been quite fully described by Edward F. Underhill, of Brocton, N. Y., in a number of the Journal of Horticulture of Boston, Mass. It is not clear in what the precise form of training and pruning consists. Mr. Underhill describes

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it as cutting loose, in the fall or winter, the tangled mass of vines on the trellis, and leaving the rest of the pruning until after the vines have flowered in the spring, and the bunches set, when good judgment and a practised eye determine what is to be cut away, until only a suitable quantity of vine is left to cover the trellis. Now this would seem to be a sufficient rule to some, but it is clear that it will leave the new beginner, or the man who had never seen a vine so pruned, sadly in the dark. And it may be said by one so pruning a vine, "I have no rule but my own judgment of what is right," which may be the case. Yet all such judgment has a certain type of a vine, and it can be made the subject of practical delineations, and of definite written rules.

The elements of its success seem to be the following: 1st. A right comprehension of the space naturally occupied by the vine. Hence, as the space covered by the vine on the trellis is much greater than usually allowed, the distance apart of the vines needs to be very large, yet with a suitable reference to the ultimate size it will attain. It even points out clearly that in the new vineyard, vines should be set out twice as thickly as they are ultimately to stand. Thus, for Concord, Isabella, and other like rampant growers, they may be ten feet apart for the rows and eight feet apart in the row. And when there seems to be a vigorous load of foliage and little fruit, as will come to every vineyard as it grows older, then every alternate vine is to be removed, leaving them sixteen feet apart; which may be afterward extended to thirty-two feet apart in the row. 2d. Another element it estimates is, the fertility of the soil. A gravel or a loam or sterile clay may not in the end allow over twenty feet distances in the row, or even ten. Hence this is a matter the most requisite to know. 3d. It requires a thorough knowledge of canes, buds, fruit buds, leaves, the way to renew canes; and all other points of fruiting well a vine. For it may be an easy matter to get one or two crops of fruit, at the expense of any degree of length of barren canes. The points of these subjects we have discussed in a former article, and they are the most difficult to be learned of all that pertains to the vine. We can easily say "prune to spurs," or to the "renewal forms," but where is the perfect system of these? Or, it may be said, "I have no system of pruning, I prune by common sense." Which is equal to a man who said, "I got over the ground, but I neither walked, went myself, or was carried." The fact is, every one who prunes a vine "renews" and "spurs," for it is impossible to do otherwise.

One thing is certain, this plan is novel at Naples, N. Y., only in its

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application to vineyards. Instances of large vines are very common. Samples of vines in successful training on very long trellises are often stated. Such is the famous Hampton vine in England; the Roanoke Scuppernong vine, the Mission vine in California, the Salem trellis in Massachusetts, not to name scores of others. But we apprehend, the exact methods of training and pruning these vines have never been very fully explained.

Another thing is clear; this plan gives large loads of fine fruit, in the very best condition; and it also corrects the barren state that almost every vineyard at times assumes. Nothing is more common than that a vineyard shall be the sixth to the ninth year charmingly loaded with fruit, and then grow more and more barren. Or bear well the fourth to the eighth year, and then become less fruitful year by year. Removing one-half or two-thirds of the vines and expanding the canes of those left often corrects this.

But the great feature is the pruning after the bunches are set, early in the season. This is quite novel, and it needs the closest scrutiny of all who own vineyards. Certainly it has a common sense look, and will one day assume a definite shape as a complete and easily understood system. It of course acts on old principles, yet involves new modifications of them. At a future day I hope to say more on this subject, when its advantages or disadvantages are better known. We have had too many failures in new systems of training and pruning, to go wildly extravagant over anything because it merely does well for a short time.

I am not aware of any other new developments of the last few years in pruning and training; but should this prove lasting in its effects, it will be a boon to us all, who love the vine. Should it load the trellis with barren canes, old stumps of canes, it will prove that it is only the plan of nature in a wild vine, and has difficulties that nature has not herself overcome when left alone.

Next in order, I ought to say something on the great progress we have of late made in the manufacture of sparkling wine. The oldest, and perhaps the establishment to which we owe the most, is the Pleasant Valley Wine Company, of Hammondsport. Situated in the heart of the Catawba region of Central New York, with the energetic men who control it, it has done more, in my opinion, to establish an excellent brand of light sparkling wines, than any and all other companies. I am no wine drinker, nor do I favor the use of wine as a beverage; yet, as we are supposed to need, in the present state of public opinion, wines that are reliable, I am glad to say that we have

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wine-makers equal to any of Europe. For I am no believer in the "priceless wine of kings." That, as well as most of the poetry of wine drinking, is the most unfounded of all imaginative dreams, notwithstanding the enrapturing wine bottles, colored glasses, and clusters of grapes that any picture may present to us. For mild, pleasant, slightly-intoxicating wines, the wines of the company just named are reliable. They have the good sense not to make them strong enough to clog the appetite, or to produce headache. For a stronger wine than I fancy, yet excellent, the rival Urbana Company, of Hammondsport, N. Y., is equally deserving. I believe they would make better wines, and suit the public better, if they would reduce the acid and alcohol one-half in their wines. They claim that I am wrong, and that they build their reputation on more character in these respects. Of the wines of Brocton, I can also speak very favorably. The Still Catawba, Iona, Concord, Delaware, and other wines of Ryckman, Day & Co., have the pure and choice flavor of German wines, and cannot but please all who like the German dryness and aroma. They have the best guarantees, as well as the intrinsic proof in themselves, of their excellence. There is, undoubtedly, a very apparent method of manipulation, by which this peculiar taste, that I have termed the German flavor is obtained; and it has become, since I wrote my last article for these reports, so well known to Americans that all who wish to understand it can easily find out how it is produced. And as I have said, the love of this style of wine once learned, banishes all love of other aromas. We even suspect the wines of Bordeaux, and disbelieve in the purity of that aroma, after this one becomes admired. And to the wine maker, it is a satisfaction that most of American grapes give this sort of wine-flavor so easily and so strongly. In its choiceness, I venture to say, American grapes excel the common European varieties; and good American wines are not excelled by any in the world. I could name other persons by reputation, but prefer to speak by knowledge; therefore, about other places on Lake Erie I cannot speak by actual use, to much extent, yet I have seen choice wines of these later establishments. Of Mr. Husmann's wines, of Missouri, I can say, that their flavor and other good qualities are not to be disputed. They are medium in strength, high in flavor. I might name at least a score of other names whose reputation is alike good, but not as well known. As to the modes of manufacturing sparkling wines, the old and reliable European way is to make the wine in large casks, and we have them large and well made in these establishments, and the wine, when partially ripe, is put in

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bottles and ripened in rooms or vaults, whose temperature is regulated by the thermometer. Then the bottles are opened, the sediment that forms, having settled in the necks of the partially inverted bottles, is drawn off, and a graduated solution of white sugar and water added. This makes the carbonic acid or sparkle. For a good quality of cheap wines this is all. For the higher grades in price, the sediment is again drawn and more sugared water added. Even three, four or five such drawings of the corks and sediment are had. It requires some skill of hand to do this correctly, and some good judgment how to do it; yet we apprehend that a great deal of the boasted skill in wine making is the merest bombast by which foreigners attempt to impose on our American good sense or verdancy. Certainly we believe that as good wine has been made by unimported skill as ever can be by the big drum of the advertisement of the imported self-autocrat, who is usually a well paid and officious idler in our wine cellars, full of conceit, and *wonderfully wise in what he does not tell us, and very silly in what he does condescend to say to us Americans.* Sparkling wine is wine and carbonic acid. Now, as the art of making so-called soda-water is younger than that of bottling sparkling wines, of course there was a time when no one knew how to make sparkling wines by any other process than the one we have just described; and there are those who insist that none but the old process is ever to be used. We shall boldly say, that just as good wine ought to be made by the same process, in principle, as the mixture of carbonic acid and pure water, commonly called and sold as "soda-water," as by the old and tedious European process we have just described; and for all practical purposes the one is as good as the other. That is, if as *fine a formula* for the wine is had, and it is ripened as carefully as it ought to be, we believe the process of carbonating in silver-lined fountains, carbonating by artificially made and washed gas, will give wine as pure, healthy and fine in flavor as that made by the old sugar-water and cork-drawing process. The only thing being ripe and pure wine of the required *formula.* Indeed, the *formula*, or the mode of preparing the wine, is the only secret and valuable matter, in my opinion, in wine-making, beyond care and honesty. Thus, the wine called "Paris Exhibition" originated at Hammondsport, New York. That formula makes the best American wine, as I consider it. The formula of the "Imperial" also is one of the same place. Both, I regard as pure wines; both, as well made. Hence, I believe as I have said, the character and the art of

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making of sparkling wines lie in the formulas more than in the processes by which they are made.

In the *Cultivator and Country Gentleman* of March 10th, 1870, while speaking of grapes, I said, "I believe it is a pleasing fact, not for wine makers, but for the good of the public, that the American people have no taste for any kind of wines. It is more than a question, whether liquors and wines are not *utterly useless* in sickness. I believe he who practises medicine without them will save the most lives. In my private practice for years, I call but two cases to mind, where any alcoholic fluid *seemed* indispensable, and I can name a score, where I have said to myself, 'the early use in sickness of alcoholic fluids, has cost weeks of suffering on the sick bed, and at last death.' So I boldly say, let any physician practise without any of these, and he will find that he has gained much and lost nothing. As to the table, they are the mere luxury of the rich. To-day if alcohol and tobacco could be destroyed, so that nature could not again produce them, human life and happiness would be vastly increased and in no case diminished."

Such were my words then, and I see no reason to regret this language. I rather say, I am year by year confirmed in this opinion, I have slowly but surely been arriving at for a long time past.

And not only is this my own private opinion, but it is to a great extent that of the American people. Not that it has taken this broad shape, but it is the impulse on which we are acting, as we move on to that coming age of better things. And if it be true that California wines fail to find purchasers at twenty-five cents a gallon, where they are made, and that almost every one of our citizens finds little or no real use for wines, then we may dismiss the manufacture of wine, as having much to do with the grape culture of the State of New York. For the future lies in excellent table fruit, rather than in wine, no matter how well or ill it is made. In our State at least it is wisely ordered, that the choice grape lands are quite limited, yet ample enough for all the fruit we shall ever want. We listened not long since to the eloquent words of a fine toned man, who advocated the alleged advantages, that would be had when our farm lands were devoted to *specialties* or subject to special farming. He seemed to forget that slavery was a specialty, and its cotton also. That no hideous wilderness ever was made so complete, as by these two specialties; and to argue that because in the vicinity of cities special gardening paid a thousand fold more than general farming, therefore, all farms should be special gardens. This would imply that the

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whole world be cities and surrounding gardens for their markets. So we believe the extravagant expectations of the especial wines, high sales of grapes, are the exception, not the rule to be looked for; that we are now forced to take the more sober second thought of the labor, the cost, and the lesser gains of grapes; that it is wisely ordered, that for our great State, wheat, corn, and other grains, with beef cattle, sheep, and the more reliable staples of life should never be supplanted by what are called specialties, either in the grape or in anything else.

We had designed to discuss the prominent varieties of grapes now before the public. This would involve the fearless statement of facts as opposed to the grape vine speculations of a few, but nevertheless, we should state the reasons of our private opinions of varieties; and this we should do were it not that the seasons of 1869 and 1870 were not fair test seasons to both old vines and new; and that we might seem to be reasoning from false data.

No one can deny that were there sent daily to the inhabitants of the planet Jupiter, our agricultural and other papers, they would get the idea that the Delaware was the principal American grape, and that no grape was so inferior as the Isabella. Were the fashionable in grape culture to be consulted, and the reports and acts of horticultural meetings relied on, there would appear to be little value in Concord, Catawba, or in any but a few pets of these gatherings. Editors and lecturers know no other. Reporters of our fairs turn up their noses at "the fox" of all but the chosen few. Yet it is a sober fact that more Isabellas are grown than of any other one grape, Concords next, and Catawbas next; and so few of the noisy grapes of editors, fairs, and horticultural meetings are grown, that they are comparatively but little known in the markets. In certain respects this is very unfortunate, for we thus impress the world that certain grapes, of little market value, are our national favorites; we injure the sale of those that are in the market; we cause the inexperienced vineyard planter to set out varieties, that have never paid very well in their cultivation, and hence will be apt to disappoint him, and we confuse our own path of progress. The bantling Delaware is not the great, exclusive, American grape it was so extravagantly extolled to be. Its cultivation gives in *weight of fruit but poor returns for the labor and acreage it requires.* Its quality is all that has been claimed for it as to sweetness. Its aroma is so feeble as to leave no flavor in the mouth, at all worthy of comparison with Black Hamburg, Chasselas Musque, or that perfection of sweetness and flavor, the *Muscat-Hamburg.* Hence we use it as

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we do "ten mills make a cent," as a rule of comparison, and that is all. It appears in market fairly, never comparatively, largely; and its sales are, by virtue of its reputation, at times at a fair figure. Its weight on the vine is increasing with culture and judicious propagation; yet he must handle it carefully, who gets any profit, as a rule, over his expenses in its culture. To Concord we also have never had the highest fancy, its aroma does not please us; and its wine, like the Delaware wine, is insipid, yet such places as southern Delaware and Missouri do much to make it a fine grape. Isabella, if cut down in all localities but those that *fully ripen it*, would be, as it really is, our best table grape which has yet been largely cultivated. The annual sales of it show that it is ten to one over all others in quantity. It is the miserable half ripe Isabellas that flood the market, grown in all sorts of places, that ruin its reputation. A really ripe Isabella has sweetness enough to please, a quiet pleasant flavor, and can be eaten to any extent. How the inhabitants of our cities bolt down the unripe bullets, sent them as Isabellas, is more than we can explain. The same remarks apply to Catawba. It is, at its best, too strong in aroma to please me fully; yet could it be grown without rot, and be fully ripened, it would be the national grape, for it meets favor with both the cultivated and the most ignorant in the community.

In saying this, I am aware that I have rather rudely crossed the artificially made reputation that a few would have to be the ruling sentiment of the land. Yet I believe the state of the markets, and the private talks and reasonings every one has, when he is about to put out a vineyard, will sustain what I have said of these old and well-known varieties.

As to the new, I confess that no variey of the native uncrossed species pleases me as well as the Eumelan, the Walter next, and the Iona and Israella after that. There can be no question that wherever *these can be made to grow and ripen well*, they will give satisfaction to the public. Nor can there be a question as to the value of Rogers' No. 1, and I say plainly, that I consider it, for the State of New York, the best of all his varieties *for December and January use.* Martha is small but a fair grape. Eva is a prolific bearer and very early, as I have seen it in bearing. Several, perhaps fifteen or twenty others, are very desirable acquisitions, but cannot be in this article fully discussed.

As to the extent in acreage of vineyards in the State of New York, I will say thus much: One of the largest districts is that of Lake Erie, and I am happy to have at command a recent estimate of

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a resident of this district, which I am permitted to use in this article. He says: "The lake border of Chautauqua county has the peculiar atmospheric influences which render the south shore of Lake Erie the genial home of the grape. The fruit is not favored by a land exposure to the south or south-east; but, on the contrary, the lay of the land gives it a north-west exposure, with a gradual rise of the surface from the lake varying from one hundred and fifty to three hundred feet to the mile, and hence the fruit does not ripen as rapidly as might be with another exposure. The warmth of the lake-water prolongs the ripening season fully a fortnight, and often longer, and nearly always secures a good quality of fruit, as well as mature buds for the next season.

"At the present, about fifteen hundred acres of grapes are in bearing on the shore between Silver creek and the Pennsylvania line. The variety mostly grown is the Isabella, which was introduced in 1824, the original vineyard still being in good bearing. The Catawba was planted about the same year, and has had good crops, but cannot be relied on oftener than one season in four *fully to mature*, and is subject to disease. No new vineyards are planted with it. The earliness and thrift of the Concord have made it a favorite, though inferior in quality. Grape growers are now selecting more carefully their varieties. The Clinton is highly esteemed for its red wine. The Delaware and Iona are popular *in quality;* the few vineyards planted with them have given good crops. Last season (1869) was wet and cold, and scarce any variety, except Concord, ripened its fruit. The Iona and Delaware dropped their leaves and did not ripen well. This year both these varieties are bearing very little fruit. The excellence of these grapes is admitted; both have suffered in reputation as *reliable producers.* The Diana stands high for the table and for wine. Rogers' hybrids, except Salem, are almost unknown. The Salem was, in 1868, planted quite largely at one place thirty acres.

"The sentiment is that wine-making and grape-growing cannot be separated, for the market changes can only thus be met. Hence there is a disposition to plant new varieties in vineyards; yet all the new varieties are looked on with more or less suspicion of lacking some one or more desirable qualities. Walter is regarded as very promising by many. The saccharometer tests for two years have shown its excellence in sugar; its quality is good, and the few vines planted are vigorous and productive. The Isabella is mostly discarded. Black Hawk and Eva are scarcely known. The Eumelan not tested. Ives but little planted.

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"Very few grape-growers make a specialty of vineyards, and hence the vineyards show generally want of care; the few who give the most care do the best.

"The manufacture of wine has become a large interest, and is increasing. In 1860 it was commenced at Brocton, on a moderate scale, and has gradually increased, the original establishment has been enlarged, and is now owned by Ryckman, Day & Co. Their cellars have the capacity of 160,000 gallons. This year they manufacture 50,000 gallons; they have never yet been able to keep pace with the demand for their wines, and have never advertised; they make red and white, dry and sparkling wines. The varieties used are Isabella, Catawba, and the other kinds new and old, named above. Mr. T. L. Harris has built a cellar, arched overhead, one hundred feet long, and eighteen and a half wide. Hon. Edward F. Underhill and brother, are also making wines, and extending their operations. Mr. R. D. Fuller, of Portland, began in 1868, and Mr. F. W. Bristol, of Glen Dora Vineyard, near Fredonia, in 1864. A stock company is also preparing for extensive business at Fredonia, and is to open in 1871."

Such are the extracts I make, and they show that there are large plans and seem to be with a fair success, sobered by reality. At Naples, N. Y., is another site where the Catawba ripens, and of late years it has, with all the Canandaigua lake region, been growing in the esteem of vineyardists. Indeed, some of the nicest nooks yet occupied seem to be claimed to be here, on this lake. But at Hammondsport, at the head of Crooked lake, has the greatest extravagance in vineyard planting been shown. There a town has gone, either wisely or not so, mad after grapes. The Catawba is their great grape; the Delaware there, first in all the land, began to pay for its culture; and other and later kinds have been to some extent proven; and the Iona finds a home worthy of its commendation to the extent so loudly claimed for it.

The Seneca lake, also, of late years opens its tens of thousands of acres, and is rapidly acquiring a name for its grapes. Some of the finest Rogers' No. 4, I have ever seen were grown on its banks, as well as other new and older varieties. The Cayuga lake lies seventy feet deeper than the Seneca, and though it began earlier than Crooked and Canandaigua lakes, and has suffered them to outgrow it in grape zeal, yet begins to see the investment of that capital long needed. The Hudson river in quantity of grapes was earlier, perhaps, than all, and yet maintains its character for excellence, though giving now the

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palm of success to other regions. Of the greater part of the State I can say but little to encourage grape-growers, beyond the few door-yard vines that all must seek. The hills and the lands for the grain and potato, and grass, cannot be given to the grape. And my advice to such as live on these lands of our State is, cultivate a few vines of any kinds that will ripen with you. Expect not great things, but a few good grapes, even if not of the best kinds.

I cannot close without a notice of a few other grapes by name. I would gladly tell of Arnold's Canada varieties, but I have failed in all my negotiations to learn their history, and to prove them. Had their originator kindly responded to me, I had been able to have said something in their favor. As it is, I am in hopes that he has something worth the trial of those who wish to prove new varieties. So likewise I have failed to secure by my own observations, a personal opinion of two other grapes highly praised. They are the Croton and the Senasqua. Yet I cannot but consider they are worthy of esteem. The Croton is claimed to be seeded from the Delaware crossed by the Chasselas of Fontainebleau. As I have already intimated, neither of the parents of this grape are my own personal favorites, for both are merely sugary and flavorless. Yet the testimony is too strong to be denied that this grape is a decided acquisition over either of its parents. And as a white grape is a national want, I cheerfully add this to the list of valuable grapes, worthy of general trial. The report is, "the bunch is very large, frequently eight or nine inches long, and heavily shouldered, berry medium size, light yellowish green, translucent, delicate in appearance, in quality fully equals the foreign grape, little or no pulp, melting, very sweet (testing 100), very productive vine, never has failed to set and ripen a good crop of fruit. Promises to be a valuable acquisition. Ripens after Hartford Prolific and before the Concord."

The Senasqua is said to be from Concord seed crossed by Black Prince. The Black Prince is a better parent than the Chasselas, yet not the best possible. The Concord should, in my opinion, be used with care as a parent, for its flavor is its fault, but its vigor is the highest, and its hardiness beyond dispute. It is therefore not a surprise to me, that a vigorous, hardy large bunch and black berry, are had in this grape, and that the commendations of it should be highly favorable. I commend them both, and as I ever say, buy new grapes of the originators only, so forget not Stephen W. Underhill, Croton Landing post-office, N. Y.

Rogers' No. 39 is another grape, so far as I am aware, little, if at

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all, disseminated generally. A few have it. I received it three different times from Mr. Rogers. Each time it came with that easily seen, but not very well appreciated disease, "black root." That is, it had a black, knotted appearance to the roots, instead of the clear, smooth, brown roots a grape ought to have. Black root is an incurable disease to which all varieties are subject. I have a Hartford Prolific I have for eight years tried to cure, and it is as bad as ever. Vines with this disease grow feebly, seem spindling in their wood; have a few vigorous branches, and loads of dead canes or branches to be cut away every year. The only cure, which is a change of root not cure of the old ones, is to layer them until healthy roots are had, when the old stump and roots are to be dug up and destroyed. Thus affected, my first No. 39 grew feebly and died. The second did not give me a cane with a healthy bud. The third gave a half dozen buds, from which Mr. Tucker and myself obtained healthy roots. Thus, after years of trial, and after condemning the vine several times, as intractable, we at last had a vine healthy and vigorous in its growth.

This has now given us two crops of fruit—that of 1869 showed it a large and excellent grape. The year 1870 it was remarkably early, very large, and beyond all dispute, soft, sweet and mild in its flavor. So far, it has proved the earliest of all American grapes. As a matter of history I ought to add notices and descriptions of that excellent chance seedling, the Walter; that old but recently introduced variety, the Eumelan; descriptions of Iona, Israella; say something of the now superseded Creveling and Miles, and other like grapes, and notice that little-known but ever prolific grape, the Montgomery, the revived Ives, and a few others that are dawning on public attention, or which I have not put in these and similar pages designed to be published in the reports where they will long be a matter of reference. On the whole, we have only thirty or forty grapes that need not be discarded from the three or four hundred on our lists, as esteemed by some worth a trial. And these few that are left are so well known that I need not give my own personal opinion of them any further in detail. It is on the right use of them that the value of vineyards depends. We have all the acreage already planted that the country at present needs; therefore I advise all new beginners to move very cautiously indeed. I am yearly visited by enthusiastic youth, and suddenly seized older men with newly acquired *grape fever*—to use American slang phrase—*on the brain.* They want to know *authoritatively* the best and the only two, three or five varieties that will give them gold, by the ton to the acre. Others

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write to me hundreds of letters to the same effect. To all such, and others who are liable to "*grape contagion*," let me kindly say: Dear friend, there are no such grapes in existence. All varieties have their excellence; every one its faults. You know not the toil, the uncertainty of all things, if you expect no annoyance in the best of grapes. Refrain from your rash attempts! Fall not into the hands of the exclusives in grape culture, be they whom they may! Buy not on reputation or alleged success! Fancy not that if you fail on table or edible grapes that *you, of all others*, can make wine pay your investment! Reflect that it costs not less than twenty to twenty-five dollars an acre, in cash paid out, for all you do, and that thousands now would be glad to be sure of that as an annual return! With these and other sober, calmer reflections, move carefully on.

These remarks lead me to say that the subject of grafting the grape has become a very important one, because the man duped to lavish rashly his money by the honeyed blissful words of the ecstatic few, at last is undeceived, and wishes to obtain a change. As, for example, *not to detail grosser cases*, the man who, in a western State, where, for a wonder, Concord fails, desires to change his vines to Ives' seedling. If he tears up the old vines, he loses years. If he can graft, he loses but one or two years. Grafting, until lately, has been but a partial success. Now it is done with a singular certainty.

Let me here give one plan that involves a new principle. At *a* is an one or more eyed scion, while *b* is the old vine or stock cut off three inches below the surface of the ground, or as near the divisions of the roots as may be, and *c*, shows three arrows which indicate that the sap rising up the stock *in the lines of the grain* of the wood strikes the scion in many places. It will be recollected that if you split the stock the cleft runs parallel to the pores of the vine. By this plan you cannot split the stock at all, *but must cut by a fine saw the cleft out*, or have an old file shaped at a blacksmith's shop like the cleft and its side, made like a file, and thus file the cleft out, *without any cracking or splitting of the stock.* The object is *the oblique setting of the stock across the lines of the sap* as the arrows show. Other plans are to bind the stock, after the scion is set, with cotton cloth, by this it is said the mucilage of the vast overflow of sap is detained, and forms a collar about the scion. So also clay, run liquid about the scion set in the stock is said to favor this essential callusing of the scion to the stock. So of other devices in grafting old vineyards with new and better kinds

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Renew old vineyards of Isabellas, Concords, Catawbas and other grapes, unfortunately set, is the rule; and is, I am pleased to say, in the reach of all who have them. Of course no man will renew by grafting an Isabella or other vineyard in a place *where this grape ripens well*, for the sake of getting a better grape, recommended to him by any one.

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CONTRIBUTION TO THE BIOLOGY AND HISTORY OF THE DEVELOPEMENT OF THE USTILAGINEÆ.

BY DR. A. FISCHER VON WALDHEIM.

[Translated from the German in Pringsheim's Jahrbucher fur Wissenschaftliche Botanik, vol. vii, part 1-2, 1869.]

I.—HISTORICAL INTRODUCTION.

As it is known, the Ustilagineæ which, as endophytic fungi, have been frequently examined and with so little success, have been from early times the objects of attention, not only of the agriculturist, but also of many naturalists. Yet, as to the nature of these parasites, there were entirely diverse and mostly erroneous opinions, even until the second quarter of our century. They were, even by later investigators, considered first as symptoms of sickliness in the supporting plant, Losana,[1] Turpin,[2] Schleiden;[3] then as disease, Unger,[4] also Wiegmann;[5] or as the product of the plant, Fries,[6] Meyen.[7] On the other hand, Bulliard,[8] Prevost,[9] Link,[10] De Candolle,[11] Philippar,[12] and others, and especially in modern times, Tulasne,[13] Leveillé,[14] de Bary,[15] Kuhn[16] and Hoffmann[17] attained only the right perception of the fungi as parasites, and as the cause of sickness in the supporting plant, and sustained it with irrefutable proof.

1 *Losana*, Delle Malattie del Grano. Carmagnola, 1811, p. 92.

2 *Turpin*, Memoir sur la Globuline (according to *De Candolle's* description).

3 *Schleiden*, Grundz. d. wissensch. Botan., III, Aufl., 1850, P. II, p. 34.

4 *Unger*, Die Exantheme d. Pflanzen, Wien, 1833, p. 356.

5 *Wiegmann*, Die Krankheiten und krankhaft. Missbild. d. Gewachse, Braunschweig, 1839, p. 116, sqq.

6 *Fries*, Syst. mycol. Gryphisw., 1832, III, p. 456, etc.

7 *Meyen*, Ueber die Entwickelung des Getreidebrandes in der Mais-Pflanze (*Wiegm.* Arch. f. Naturg., 1837, p. 419–421).

8 *Bulliard*, Hist. d. Champignons de la France. Paris, 1791, I. p. 90.

9 *Prevost*, Mem. sur la cause immediate de la Carie. Montauban, 1807.

10 *Link*, Observ. in ord. plant. nat. Dissert. I, 1809, and in other publications.

11 *De Candolle*, Physiol. Vegetal. Par. 1832, III, p. 1435. Also in earlier publications.

12 *Philippar*, Traite organogr. et physiol.-agric. sur la Carie, etc. Versailles, 1837.

13 *Tulasne*, Memoir sur les Ustilag. comparees aux Ured., Ann. d. sc. nat. 3, ser. t. vii, 1847. Second Mem. s. l. Uredinees et les Ustilag., Ann. d. sc. nat. 4, ser. t. ii, 1854.

14 *Leveille*, Recherches s. l. developp. des Ured. Ann. d. sc. nat., 2 ser., t. xi, 1839. Etudes sur les champign. de la fam. d. Ured., Dict. univ. d'hist. nat., par d'Orbigny.

15 *De Bary*, Unters. uber d. Brandpilze, 1853. Recherches sur le developpement de quelque champ. paras., Ann. d. sc. nat., 4 ser., t. ii, 1863. Also in other publications.

16 *Kuhn*, Die Krankh. der Kulturgew, 2 Aufl., 1859.

17 *Hoffmann*, Ueber den Flugbrand, Bot Unters., published by *Karsten*, 1866, p. 192, seq., etc.

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In order to save repetition, I refer the reader directly to the works of Tulasne[1] and de Bary,[2] where the details of the different historical periods regarding this subject will be found defined and illustrated up to a period later than 1840. We will, therefore, pass over these, and only consider the most important facts which were observed mostly by later naturalists.

1. The localization of the Ustilagineæ (or to express it more clearly, the place of their development) became an object of the earliest investigations, as well as such changes in the supporting plants as were caused by them and most easily perceived.

The work of Tulasne, just mentioned, regarded the parasites in this connexion as worthy a detailed observation. Especially are the sickly changes in the affected plant particularly specified, which are produced by Tilletia Caries Tul., and Sorghi vulgaris Tul., Ust. Carbo Tul., Maydis Lév., and antherarum Fr. The observations regarding Ustilago Vaillantii Tul., Candollei Tul., Utriculosa Tul., and Duriaeana Tul., are incomplete; still less specific are those regarding the remaining species mentioned in the systematic part of that work. Accurate delineations of the parts of the plants affected by this parasitic disease add to the value of Tulasne's treatise.

Subsequently we find also in this connexion, many accounts of Ustilago secalis Rabh. (Rabenhorst).[3] Urocystis occulta Rabh. (v. Schlechtendal),[4] Ust. Maydis (de Bary)[5] (Kühn),[6] longissima Lév., hypodytes, antherarum (de Bary),[7] Candollei (de Bary),[8] Sorisporium Saponariae Rud. (de Bary),[9] Tilletia Caries, destruens Dub., Urocystis occulta (Kühn),[10] and Ustilago Carbo (Kühn[11] and Hoffman[12]).

2. Early naturalists had also given attention to the mode and nature of the propagation of Ustilagineæ. First, however, Prevost, that indefatigable observer of parasites, made the surprising discovery that the fungus spores germinate. He observed the germination development of Tilletia Caries and Ustilago Carbo. In the former, he discov-

1 Premier Mem. s. l. Ustil.

2 Brandpilze.

3 *Rabenhorst*, in Flora, allgem. bot. zeit. 1849, p. 209 sqq.

4 *Schlechtendal*, Bemerkungen zu einer Decade fur d. Flora v. Halle n. Pilze. Bot. zeit. v. *Mohl* and *Schlechtendal*, 1852, p. 602 sq.

5 Brandpilze, p. 4–8.

6 Ibid p. 70 sq. Unfortunately I am unacquainted with Kuhn's treatise on Ust. Maydis in *Rabenhorst's* Hedwigia, 1863, and in the Zeitschrift d. landw. Centralver. d. Prov. Sachsen, 1866, p. 108.

7 Ibid, p. 8–12.

8 See official report of the meeting of the German Naturalists and Doctors in Gottingen, 1854

9 Ibid. Later likewise in Champign. Paras. p. 96.

10 Ibid, p. 54 sqq.

11 Ibid, p. 64. ib. p. 51–53, a short list is given of the supporting plants upon which Ustilagineæ have been observed.

12 Ibid.

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ered on the exterior of the promycelium, the so-called primary sporidium and the spores detached from it.[1] In *Ust. Carbo* he perceived only the germ tube, provided with two or three branches.[2]

The germinating power of the Tilletia spores was again verified by De Candolle,[3] Carm and Vandenhecke.[4] Even Tulasne failed in his experiments upon the germination of this Tilletia until 1853, when he communicates his observations of their more or less capricious germination.[5] He discovered long and short, sterile germ tubes crowned with clusters of eight or ten primary sporidia (Tulasne's secondary spores), and described also the till then unknown H-formed connexion of the sporidia which appears only out of water, some of the united spores germinating, but a greater number of them producing secondary sporidia which also germinate, or are capable of producing tertiary sporidia.

Kuhn gives a yet more particular account of the germination of this Tilletia.[6] According to him, the mode of germination of Tilletia lolii Auersw.[7] is very similar.

De Bary, whom I here follow, carried out this terminology for these, as well as also for Ustilagineæ, by designating the first tube proceeding from the spore as *promycelium*, the bodies first detached from this as *sporidia*, the next as secondary sporidia, and so on.[8] This terminology was already employed by Tulasne for *T. Caries* and *U. receptaculorum*.[9]

Besides Prevost, Tulasne observed again the germination of *Ustilago Carbo*. He saw, in like manner, upon the promycelium one or two little lengthened branches (probably sporidia) as well as their separation by contraction.[10] Bonorden also succeeded at this time in germinating the *U. Carbo*.[11] More complete observations were published by Kuhn.[12] He mentions the formation of primary and secondary sporidia, knee-formed connexion of the promycelia, and the germination of separate portions after breaking up.

In his first memoir Tulasne describes also the germination of

1 Ibid.
2 Ibid. p. 29 sq.
3 Physiol. veget. 1832, III. p. 1436.
4 In 1835. See Tulasne 1r Mem. s. les. Ustil. p. 38.
5 2e Mem. s. l. Ured. pp. 161-163.
6 Ibid., pp. 57-60.
7 Ibid., pp. 61, 62.
8 *De Bary*, Morphol. und Physiol. d. Pilze (Handb. d. phys. Botan. von *Hofmeister* II. B.), 1866, p. 150 sq.
9 2e Mem. pp. 159 sqq.
10 1r Mem. pp. 32-34.—2e Mem. p. 157.
11 *Bonorden*, Handb. d. allg. Mykologie, 1851, p. 39.
12 Ibid.,p. 66-67.

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Ustilago antherarum.[1] The promycelium attains twice the diameter of the spores, towards the middle is of greater circumference, and divides into two or three parts. Later,[2] Tulasne adds, that the promycelium, during its attachment to the spore, divides and, separated from it, attains a circumference three times larger than originally, but without increasing its length. According to de Bary,[3] the germination of this species is similar to that of Ust. Carbo.

Tulasne also describes in his second memoir, the germination of the Ustilago receptaculorum of Tragopogon pratensis and Scorzonera humilis.[4] He observed in the first the cross division of the promycelium into from two to four cells, out of which sprout, singly or in pairs, almost stemless "reproductive bodies" (sporidia). Among those broken off, many are connected in pairs by a bridge. Ust. receptaculorum of Scorzonera humilis showed smaller dimensions of the promycelia and sporidia, and a quicker falling off of the latter as well as a greater number, after two or three days. Very true to nature are the accompanying illustrations; also those of de Bary, who remarks of this Ustilago, that "as it appears the sporidia are successively detached."[5]

Kuhn was the first to describe and delineate Ustilago destruens, Maydis and Urocystis occulta.[6] In Ust. destruens Kuhn saw very similar and also partly different phenomena of germination from that of the Ust. Carbo, a partly hyaline production and granulation of the promycelium, the formation of stemmed egg-shaped sporidia on the side, or unstemmed terminal ones, as well as lengthening and ramifying single germ tubes. The knee-formed lateral branch of the promycelium he thinks sometimes becomes separated.

Ustilago Maydis germinates by forming a straight, wavy or bent promycelium (during which process the end may shoot out in a thread), which seldom has a lateral branch, and still more seldom shows the knee-formed bending. Sporidia appear on the side and point of the promycelium.

Urocystis occulta, according to Kuhn, developes from a skein of spores, at the most, from two to three germ tubes of different thickness. On the stronger promycelium only, from two to six primary sporidia appear, mostly of different lengths. The primary sporidia frequently separate, grow then further, and only seldom detach secondary sporidia. In two cases, weak promycelia occurred on the side or point instead of sporidia. In only one case an H-formed connex-

[1] P. 34 sq.
[2] 2e Mem., p. 158.
[3] Morphol. und Phys. d. Pilze, p. 151.
[4] P. 158–160.
[5] Ibid., p. 150.
[6] Ibid. page 69, sqq.

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ion of the primary spores was shown, and that in the upper part. On the contrary, according to de Bary,[1] such connexion of the Uroc. occulta and pompholygodes does not happen.

Hoffman was the first to mention the germination of the Ust. longissima.[2] De Bary[3] gives the first accurate delineation of its promycelium, together with its sporidia. The promycelium, according to him, is a thin cylindrical tube, from two to three times the length of the diameter of the spore; from its point is detached a spindle-formed cylindrical sporidium; but whether generally single, or several in succession, is still to be determined.[4] Moreover, Hoffmann communicates a few facts regarding the influence of various circumstances[5] upon their germination; also Kuhn[6] and de Bary.[7]

3. Concerning the spore form of the Ustilagineæ, as well as the mycelium, Meyen was the first to describe the spore-forming threads (according to my terminology), and the formation of the spores from them.[8] He made observations, though by no means complete, of the Ustilago Maydis. According to his description, in the maize smut balls, are seen little transparent slimy deposits, from which spring thread-formed, unjointed, ramifying "little plants," which are repeated, ramifying and becoming corymbiated, from which little irregular globular bodies detach, until at last they all break up into such globules.

Leveillé describes the latest conditions of Ust. Maydis, as seen by him, as short, knotty, articulated threads, and simply adds that the spores spring from them.[9]

Meyen soon after confirmed his earlier investigations on the spore formation of Ustilago Maydis, and added some new discoveries on that of Ustilago hypodytes.[10] The latter appeared to him as a compound mass of slime-covered threads, on the surface of which appear the "brand pustules," by the detaching of those threads at the point, until the whole mass was converted into such "pustules."

Tulasne knew the latest condition of the Ustilagineæ only as a

1 Ibid., p. 152.
2 *Hoffmann*, Untersuch ub. d. Keimung d. Pilzsporen, *Pringsh.* Jahrb. f. wiss. Botan., 1860, II. Bd., p. 273.
3 Ibid., p. 151.
4 Ibid.
5 Ibid., p. 297, sqq. Compare Ueber Pilzkeim. Bot. Zeit. v. *Mohl* und *Schlechtend*, 1859, p. 209, sqq.
6 Ibid., pp. 46–48.
7 Ibid., p. 209, sqq.
8 Ibid., p. 419, sq.
9 Recherches s. l. developpement des Ured., pp. 5–16.
10 *Meyen*, Pflanzenpathologie, 1841, p. 103.

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gelatinous slimy mass, which in Ustilago Maydis was sometimes found in the inter-cellular spaces, and even in the cells.[1] These masses separate (in Ustilago Maydis) into little parts, around which is formed from the surrounding slime, a double membrane, the endosporium and episporium. The spores ripen from the centre of the attacked parts of the supporting plant toward the periphery. Tulasne also discerned in the slimy mass, short, ramifying threads, with nitrogenous contents, evidently spore-forming threads, whose import remained obscure. In like manner he made the same observation in regard to the spore formation of the Ustilago antherarum.[2]

Tulasne[3] first observed the formation of the Tilletia spores upon the ends of short branches springing from a common stem; for Prevost[4] and also Philippar[5] had only a dim insight into the manner of the formation of Tilletia spores.

De Bary succeeded in showing the formation of the spores not only of Ust. Maydis, but also of Ust. longissima, hypodytes, and antherarum, out of distinct spore-producing threads.[6] He designated, however, these threads by the name of "Mycelium." The position of these in Ust. Maydis is supposed to be always in the inter-cellular spaces, as had been previously,[7] and was afterwards,[8] mentioned by Unger also; they appear colourless, somewhat dark, as it were opalescent, and change into a slimy gelatinous mass, from which the spores form from the point of the branches backward. The account of the effect of different reagents on these filaments,[9] leaves no doubt that they were only spore-forming threads. The latest spore conditions of this species appear as circumscribed, roundish masses, like beads, strung on an indistinct thread. Then a membrane formed around these bodies, and the cells almost doubled in size. When the spore became ripe, this thread had disappeared. De Bary also examined the latest mass in the intercellular spaces of Ustilago longissima, in the form of short thin threads, which, for the greater part, had already detached spores, and, in fact, frequently in bead-like branched groups.[10]

As in Ust. longissima, so de Bary perceived only spore-forming threads in Ust. hypodytes.[11] This is indeed proved by his opinion

1 1r Mem., p. 20, sqq.
2 Ibid., p. 25.
3 Ibid., p. 30,
4 Ibid., p. 10.
5 Ibid., pp. 18 and 21.
6 Brandpilze, pp. 5–14.
7 *Unger*, Beitrage sur. vergl, Pathologie, 1840, p. 34.
8 *Unger*, Anat. u. Physiol. d. Pflanzen, 1855, p. 129.
9 Ibid., pp. 13–15.
10 Ibid., pp. 8, 9.
11 Ibid., pp. 10, 11.

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at that time regarding this ustilago to be an epiphyte that only existed on the epidermis; an opinion which was also defended by Meyen.[1] The ripening of the spores takes place here on the outside toward the epidermis.

De Bary found, in the male blossoms of the Silene Otites, a whitish mass of the Ust. antherarum composed of delicate, colourless, tufted, ramified and confused threads, from the points of which are formed the bead-like spores.[2]

De Bary soon after treats of the spore formations of Ust. Candollei and Sorisporium Saponariæ.[3] In the latter the spores are formed out of a granulous slime, surrounded by clustered "Mycelium" (also spore-forming threads). The spores of Ust. Candollei are formed in the same manner as in the other species of ustilago, only that at the same time they form in the ovary a columella, together with peridia, also mentioned by Tulasne.[4]

According to Kühn's description he knew about the mycelium of of Ust. Maydis only imperfectly, and if his remarks regarding the threads designated by him as mycelium are correct, then it was the same with Ustilago destruens and Tilletia Caries.[5] Although in the introduction[6] he speaks in general of the mycelium of the smut fungi, he refers, without doubt, afterwards only to Tilletia Caries and Ust. destruens, which alone are used as examples, especially as later true mycelium is specified only for Ust. Maydis. The mycelium, according to him, developes from the germinating threads which penetrate the supporting plant abundantly and spreading in all parts of the plant, if many germinating threads penetrate; in the contrary case, growing up with it more sparingly. The under, older part of the mycelium threads soon dies away, becomes empty of protoplasm, clear as water, and disappears; they only continue growing on the point. This is the reason its observation is so difficult in the developed supporting plant. Kühn refers to the plate, which, however, to me, has rather the appearance of spore-forming threads; while Kühn, as seems probable, much oftener considered these threads as the true mycelium; consequently he was not able to arrive at any correct conclusion. This is shown in the following definition: "The mycelium threads of the smut fungi are

[1] Pflanzenpathol, pp. 122 and 124.

[2] Ibid., pp. 11-13.

[3] Official report of the meeting of German naturalists in Gottingen, 1854. Also Flora, allg. bot. zeit., 1854, pp. 647, 648.

[4] Ir. Mem. pp. 94, 95.

[5] Ibid., pp. 49-50, and p. 73.

[6] Ibid., pp. 49-50.

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very delicate and of a very small diameter, and easily known by their *dense*, blueish-coloured protoplasm contents."[1]

Kühn gave a more copious description of the spore formation of Tilletia Caries, which confirmed Tulasne's investigations,[2] and of Ust. Carbo, Maydis, and Uroc. occulta. The latest condition of the Ust. Carbo Kühn observed as "crumby, soft, glittering" masses, composed of numberless tender ramified threads.[3] Through the entire length of the branches, protuberances developed, which, at the end of the developement, separate into spores.

In the Ust. Maydis it is thought the spores are formed on especially fine, tender threads, which grew from the "principal mycelium threads."[4] The ends of these, swelling for the purpose, produce granules which increase in size, whilst the threads themselves, at the same time, empty and branch into corymbiated forms. The granules become separated one from another by a cross-wall, and the resulting cells, assuming a roundish shape, become spores.

Kühn was the first to describe the peculiar spore formation of the Uroc. occulta.[5] Bladder-like swellings, which become cells, originate in the spore-forming threads. Each such cell remains single, or divides into two or three, and by side shoots forms several secondary spores, together constituting the spore-skein. The spores which come first commonly occupy the middle of the little pile of spores; sometimes the secondary spores are only partially joined, but always have their own episporium.

De Bary remarked, in this connexion,[6] that the little clear cells are not sister cells of the dark spores, but limbs of the young hyphen, which appear on the outside of the spore while yet young. De Bary's opinion appears to me to be correct, because an entirely analogous process takes place in the formation of the spore-balls of the Sorisporium Saponariæ.

That Hoffmann made no real distinction between mycelium and spore forming threads, is to be seen from his treatise on Ust. Carb.[7] No real mycelium is mentioned during the description of the spore formation. All the thicker and thinner branched and bent threads have been nothing but spore forming threads in different degrees of development.[8]

This is plain, from Hoffmann's statement, that they were "crowded full of plasm," as well as from their shape and appearance. For even

[1] Ibid., p. 50.
[2] Krankh. d. Kuturg., p. 56, sq.
[3] Ibid., pp. 65, 66.
[4] Ibid., pp. 73, 74.
[5] Ibid., pp. 78, 79.
[6] Morph. und Physiol. d. Pilze, p. 125.
[7] Ueber den Flugbrand.
[8] Ibid., p. 201.

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the "fine mycelium" which sometimes is called the scarce mycelium, and which is something thought to spin completely around the young ear as a mesh-net (later in my observations I will return to this latter circumstance) can only be considered as a transition form of the true mycelium, which is formed entirely different in spore forming threads, or as a superfluous, so to speak, wasted residue of it (only a conjecture). The investigation of the spore formation during the time of the gelatinous condition of the threads in which only the glittering parts of the contents are still to be seen, makes Hoffmann's conjecture, among others, that in the origin of the plasm grains there is a similarity to an independent cell formation.[1]

The perennial character of the mycelium (of the Sorisporium Saponariæ), was first made known, some years ago, through de Bary's successful examinations.[2] He found it in all parts of the supporting plant, and in order to demonstrate its vitality planted a saponaria branch in which mycelium existed. In the course of a few months two shoots appeared covered with leaves. An examination of one of the branches showed mycelium very plainly; the other developed blossoms later, whose flowers were all infected with the parasite. By this experiment the correctness of Aymen's investigations was proved, who mentioned as early as 1760, that in his garden for five successive years the same plants of wild pinks and saponaria officinalis had only smutted flowers.[3] Besides, de Bary was the first to refer to the suckers (see my observations) of the Sorispor. Saponariæ, in that he mentioned that the delicate intercellular mycelium threads send stronger branches into the cells, which generally have an irregular contour, and by braiding together form little various-shaped skeins resembling very small membranes.[4]

4. After the spores of the Ustilagineæ were discovered, the idea became common that it was only through them that the parasite could be in the supporting plant; but in what manner has been explained in different ways up to the present time. First it was supposed to be the granules contained in the spore (De Candolle,[5] Link);[6] after the discovery of germination, it was the germ tubes which penetrated the supporting plant and transplanted the parasite (Prévost,[7] Léveillé).[8] I omit the still less remarkable opinions of Bulliard,[9] Sylvestre,[10] and Philippar,[11] and mention only the opinion of Tulasne,

1 Ibid., p. 202.
2 Champign. paras., p. 96.
3 *Tulasne*, 1r Mem. sur les Ustil., p. 42.
4 Ibid., p. 97.
5 Ann. du mus. d'hist. natur. de Paris. 1806, t. xi. p. 56 sq. Physiol. veget. III, p. 1437.
6 Ibid.
7 Ibid.
8 Dict. univ. d'hist. natur d'Orbigny, ibid.
9 Ibid., I, p. 91.
10 Annales de Fromont, t. iv., p. 145.
11 Ibid., pp. 37-38.

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to whom it seemed most probable that the germ tubes of the Tilletia spores penetrated either the young stems or root of the wheat, by piercing the epidermis of these parts.[1]

De Bary, relying on the similarity to the Uredines and on his own observations, believed that the germ tube enters the stomata of the supporting plant and is further developed in the interior of it (as, for example, Ust. Maydis); or it developes only on the epidermis, as Léveillé and Decaisne observed in Ust. receptaculorum and Meyen and himself in Ust. hypodytes.[2] The mycelium of Ustilagineæ, according to the view of de Bary at that time, was newly generated each year from the spores, and at each time through the spore formation became completely used up and disappeared.[3] At that time, de Bary conceded the possibility of its perennial character, but considered it hardly probable.

Kühn mentions having directly investigated the penetration of the germ threads of Tilletia Caries in wheat, and even in the root nodes of the little germinating plants.[4] He germinated, for this experiment, grains of wheat sprinkled with numerous Tilletia spores, placed them in earth near the surface, and kept them in a sufficiently moist condition. Sections through the germinating wheat, even before the death of the rootlet and the complete development of the first leaf, showed him the germ threads penetrating directly through the cells of the root nodes. The penetrating germ threads arise from the sporidia, or are an immediate attenuation and ramification of the point of the germ tube.[5]

De Bary mentions having repeated Kühn's observations on the penetration and vegetation of the Tilletia Caries with success.[6] In another work,[7] however, he supports the statements of the penetration of the "germ tubes" only from the investigations of Kühn and Hoffmann. We may conclude from this that his earlier approbations of Kühn's experiment related only to the vegetation of the Tilletia Mycelium, and not to its inoculation of it.

Hoffmann considered the inoculation of the Ust. Carbo, demonstrated by his own experiments.[8] After the consideration of several places of penetration, Hoffmann regarded the space between the inner side of the split root sheath and the young root as the normal and most suitable place for that purpose. Spores deposited at this point developed an abundant mycelium which grew inward and upward until near the vegetation point. Whence this mycelium originated,

1 1r Mem., p. 41.
2 Brandpilze, p. 123.
3 Ibid., p. 129.
4 Ibid., pp. 48, 49.
5 Ibid., p. 61.
6 Champign. paras, p. 99.
7 Morph. u. Physiol. d Pilze, p. 188.
8 Ibid., pp. 202-206.

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from the germ tube or out of the sporidia, is not mentioned, nor its outward appearance. The accompanying delineation resembles little my representation of the mycelium of Ust. Carbo. Moreover, the connexion of this mycelium with single spores, described by Hoffmann, might have been accidental; that is to say, merely a juxtaposition or superposition of the spores having taken place. Only the undeniable connexion of the observed threads with ustilago spores would be a sure proof of the mycelium originating from them, if the latter had not possessed an entirely characteristic stamp of its own.

Besides, Hoffmann regards a penetration through the primary nodes as possible, because after direct application of the spores he could perceive, at this place, inward penetrating germ-tubes.[1] Hoffmann appears also to concede that the penetration could take place through the stomata. He likewise tried inoculation by applying the spores on the burst root-sheath or to the uncovered primary nodes or in the region of the point of vegetation; in this way, in a few cases out of several hundred failures, he produced smutted ears. The sprinkling with spores of other parts of the growing barley-plants resulted only in failure.

Hoffmann also states[2] that he placed spores of Ust. destruens, with millet seeds moistened with spittle, and succeeded in bringing them to germination in boiled earth. From six of these seeds Hoffmann produced three plants with smutted panicles.[3]

5. It remains to mention, in conclusion, the observations of spore structure, which belong also to the process of the development of the parasites.

Tulasne first discerns a double membrane in the ustilago spores: endosporium and episporium. The first, the inner, delicate and only perceivable when the episporium bursts; the latter is colored and smooth, or provided with various protuberances, which in Tilletia Caries, after the application of sulphuric acid, became visible as a protruding net formed of little polygonal meshes.[4] The contents of the spores are pale, and composed of oleaginous grains. The yellow iodine reaction shows the presence of nitrogenous substances.

De Bary agrees with Tulasne in regard to the membrane, but finds

[1] Ibid., pp. 204–205.

[2] Ibid., 206.

[3] That the infection with spores sometimes produced smutted flower stems, showed only the possibility in these particular cases of a previous presence of the parasites in favorable conditions for propagation, which, however, had escaped his examination, especially as all parts of the plant cannot be examined when their further development is desirable.

[4] 1r Mem., p. 31.

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in the contents a grain, apparently identical with a nucleus.[1] Later, however, de Bary refutes these latter views, and considered the grain only a protoplasm body.[2] Sugar and sulphuric acid coloured the grain rosy red. The protuberances of the episporium of Ust. Maydis and antherarum did not disappear by boiling in a solution of potash; according to de Bary's opinion at that time, the episporium may originate before the inner skin.[3]

Kühn, on the contrary, considers the episporium a result of the secretion of the endosporium, and analogous to the cuticle of the pollen grains.[4] Later de Bary expresses the same view.[5] Various chemical details concerning the spores are also mentioned at the same place by de Bary,[6] and at other places by Hoffmann.[7]

6. A review of the foregoing historical data, in which the so far known results of many excellent experiments have been briefly stated, renders it possible to decide on the questions yet to be answered.

The Mycelium of the Ustilagineæ is the least known of all parts of the parasite. We only find it mentioned for Sorisporium Saponariæ, partly also for Ust. Maydis, and if, in the inoculation experiment of Kühn and Hoffmann, a mycelium has been found peculiar to the investigated parasite (which I may not doubt), also for Tilletia Caries [Kühn], Ust. destruens [Kühn], and Carbo [Hoffmann]. But notwithstanding these accounts, we possess no thoroughly characteristic description of the mycelium, but merely intimations which require further developement.

Also *spore-forming parts*, although multifariously observed, are not sufficiently investigated, to allow a clear view of the changes proceeding by degrees in them from the beginning of the formation of the spores, until they become fully ripe. And then the spore-forming

[1] Brandpilze, pp. 14, 15.

[2] Morph. u. Physiol. d. Pilze, p. 125.

[3] Brandpilze, p. 15.

[4] Ibid., p. 50.

[5] Morph. u. Physiol. d. P., p. 127.

[6] *Pringsheim's* Jahrb., 1860, II, p. 308, sqq.

[7] Soon after the conclusion of this historical introduction, I received two new works on Ustilagineæ by Hallier, Mycolog. Unters, von E. Hallier, part iv, Entwichlungsgeschichte des Staubbrandes, Ustilago Carbo; and part vi. Entwg. des Steinbrandes, Till. Caries. Landw. Versuchs-Stat., 1867, pp. 260-272 and 355-363. According to Hallier, the Ustilago developes from Micrococcus, and can also be produced from Aspergillus, and probably also from the Eurotium, representing an interposed Oidium between both. The Tilletia spore grains [!] either divides into many, and at last changes into Micrococcus. etc. (as far as can be seen from the text and drawing, it refers here only to the very oily contents, which appears in the form of a large drop of oil in the Tilletia spores, which can divide into many smaller, like the others); or, according to the ordinary germination (with a promycelium), produces finally penicillium; from the latter Tilletia again, etc. I confess, that the "facts" mentioned by Hallier are presented in a form not so convincing to me as to compel entering, unwillingly, by a more extended consideration of them, upon a longer discussion, for which this is not the appropriate place. I content myself, therefore, with referring the interested reader to the works of Hallier above cited.

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threads have been recognized only for a few of the Ustilagineæ; but in the most of them a very advanced condition is known, in which that threads appear as a gelatinous mass with shiny particles.

The spore formation itself has been more generally investigated; those of the Tilletia Caries the most extensively. For the Ustilago, Urocystis and Sorisporium species more complete, correct and comprehensive investigations are yet very desirable.

The structure of the spores requires a revision in conformity to the present state of knowledge, especially a thorough investigation of the structure of the episporium.

The germination of the Ustilago spores has been established for Tilletia Caries and Lolii, Ustilago Carbo. destruens, Maydis, antherarum, receptaculorum, longissima, Urocystis occulta and pomphologodes; though in comparison more accurately investigated in the first three, in which, also, the sprouting of the sporidia has been observed.

The manner and mode in which the parasites come upon the supporting plant, is still wrapped in complete darkness. For besides the inoculation experiments with Tilletia Caries and Ust. Carbo and destruens, we know at present nothing in relation to all the remaining Ustilagineæ, and how many repetitions are needed of Kühn's and Hoffmann's inoculation experiments, notwithstanding all the confidence which is due them, will be seen hereafter.

The localization of the parasite *for the purpose of its spore formation*, has been most fully investigated. However, as to the occurrence of the parasite in the different parts of the supporting plant, we have but little knowledge beyond the observations already mentioned.

If I, for my part, notwithstanding the excellent works, especially of Tulasne, de Bary and Kühn, did not hesitate to take up again the laborious investigation of the Ustilagineæ, it was only upon the suggestion of Professor de Bary, my honoured instructor, and in the hope that my own limited observations might contribute to the advance of the knowledge of the biology and course of developement of these endophytes.

My observations, which are communicated in the following pages, I consider by no means complete, particularly as regards the inoculation experiments. They contain also many already anticipated discoveries; in the latter case they can also serve as confirmation, and have, therefore, not been excluded.

The most of these observations were made in the Freiburg botanical laboratory during the summer of last year, where Professor de

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Bary kindly assisted me with advice and material, for which I take occasion to express my deepest obligation. For kind contributions of Ustilagineæ I feel bound also to offer my grateful acknowledgments to Professor A. Braun and Dr. L. Rabenhorst, as well as Messrs. A. Millardet and P. Magnus.

II. Personal Observations.

1. *Mycelium.*

Upon looking at the tissue of the supporting plant under new accumulations of different Ustilagineæ, as, for instance, Ustilago hypodytes, Sorisporium Saponariæ, etc., it will be found penetrated with threads, which are in immediate connexion with the spore-forming part. Investigation shows that the spore-forming parts grow as branches from these threads; these latter must, therefore, be regarded as the *Mycelium.*

The mycelium is the vegetative part of the parasite. In it no spore formation takes place. It appears well defined in shape, often ramifying, mostly in double contoured threads (i, 2; ii, 9,[1] etc.), often with watery and not unfrequently globular contents.[2]

The branching may frequently be ramified and laced into skeins, especially if they occur in thick walled cells. The direction of the thread is mostly parallel to the length of the organ, for example, upright in the stalk; oftener, however, especially when much ramified, winding or bent and irregularly curved.

In the same species the mycelium threads run in and between the cells of the supporting plant (ii, 2 and others). On the contrary, the short, often coiled, little branches originate in the cells (ii, 3, 4, 10). The intercellular occurrence of the latter, and their resemblance also in form to the suckers of peronospores, entitle us to regard them likewise as such in the Ustilagineæ. Their operation is likely similar to those of the suckers in the phanerogamous parasites. The oftener these suckers appear, the shorter is the long-extended mycelium part. The thicker the walls of the cells through which mycelium passes, the more plentiful are the suckers.

It is an especial characteristic of the mycelium, that it has strong walls, which are particularly distinguished by the sometimes very marked double contour of the membrane, and the power of resisting

[1] The Roman figures denote the tables, the Arabic the figures.

[2] Also in immature parts of the plant, mycelium penetrating them and developing with them is characterized in the same way, and presents later the marks cited. It is, therefore, by no means an old or exhausted part of them which presents these characteristics; but the true mycelium (consequently no transition form) is always the same whether young or old.

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some reagents. A solution of potash produces only a rising of the thread;[1] concentrated sulphuric acid dissolves the thread, though remarkably slowly. Treated with iodine and sulphuric acid, or chloride of zinc and iodine, its membrane does not show the blue reaction of cellulose. The interior, which, as mentioned, is very watery, and often filled with vacuoles, shows none or only a very weak protoplasm reaction.

In different species cross walls appear in the mycelium, and in some there are more numerous vacuoles than in others. Ust. hypodytes (ii, 7) possesses numerous cross walls and vacuoles; and also Tilletia endophylla de Bary, (in the mycelium of the leaves, but less in those of the stalk). This appearance is manifestly in connexion with the degree of waste of the plastic contents.

Up to the present time I have found the mycelium in the following species: Tilletia Caries Tul., endophylla de Bary, de Baryana mihi, Ustilago Carbo Tul., Maydis Lév., hypodytes Fr., antherarum Fr., flosculorum Fr., receptaculorum Fr., longissima Lév., Candollei Tul., utriculosa Tul., urceolorum Tul., and Sorisporium Saponariæ Rud.

The form and dimensions of the mycelium are more unvarying than the spore-forming threads, but change, not inconsiderably, according to the species.

In Tilletia (T. endophylla and de Baryana) the mycelium appears as comparatively long extended threads, which are especially distinguished by the frequent formation of worm or coil-formed suckers (especially in the rhizoma and nodes), as well as by many round or globular sprouts appearing near one another. The free mycelium ends have a blunt, rounded point. The thickness of the threads amounts to from .002 to .005^{mm}; their length from one branch to another, or from the suckers to the branch, changes materially; in some threads it is hardly .002^{mm}, in others ten times or more.

The Ustilago species possesses more variously formed mycelium. Ust. longissima has many long extended threads with a diameter of from .003 to .004^{mm}, with conspicuously deficient and imperfect suckers. Ust. Maydis has a similar mycelium though with more numerous suckers. On the contrary, in Ust. Carbo it is much thinner (that is in Arrhenatherum elatius), hardly .002^{mm} thick; in the same species upon oats it appears more wavy and twisted, which

[1] When the influence of the reagent is not too strong, the supporting tissue becomes more transparent, and the thread comes out plainer, and the potash can therefore be employed with advantage for the clearer observation of an existing mycelium. After some hours' influence of thinned glycerine, the mycelium became also more distinctly visible in the preparation.

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however depends much upon the nature of the penetrated supporting tissue.

Generally there appears in the nodes, especially in their thick walled cells, partially thinner mycelium, very much twisted, and furnished with suckers, for example, in Ust. hypodytes, in the rhizoma, and in the nodes of the supporting plant. The mycelium of Sorisporium Saponariæ is particularly distinguished by very numerous coiled suckers, especially in the thick walled parenchyma tissue of the root and the nodes, between the bark and fibrous tissue, among the clusters of crystals (ii, 10). On the contrary, where the tissue is tender, wider celled and long extended, as in the internodes, suckers seldom appear, and the threads are twisted less and thicker, especially in Ust. Maydis, longissima and Carbo.

In the greater number of the ustilagineæ, the mycelium is found most frequently in the cells themselves. Relatively, Till. endophylla, Ust. longissima and Maydis appear oftener than other species to have long extended intercellular mycelium. So, for instance, Tilletia endophylla is often seen in the interior of the cells (especially of the leaves) with several rows of straight running mycelium threads, boring through the cell walls in the same direction, and extending through many cells (i, 1). Ust. Maydis also forms long, straight running mycelium skeins, often going in a long row through many (that is, eight or more) cells, especially in the ovary wall and the woody parenchyma cells of the rhachis nearer to the surface.

The long, and for the most part straight, mycelium threads have a remarkable appearance in some ustilagineæ, especially often in Ust. Maydis (i, 6), and Sorisporium Saponariæ (ii, 12), less frequently in Ust. Carbo (ii, 1), which, according to unpublished observations of de Bary, appear also, although seldom, in uredos. The mycelium threads become covered by a cellulose membrane, which often becomes very thick, entirely enveloping the thread, rendering it invisible; in other cases some of its parts or branches are still visible (i, 6 and 6*a*). This cellulose membrane belongs, without doubt, to the membrane of the cells of the supporting plant; it represents an immediate continuation of their layers, as I could distinctly perceive in a few cases. It appears in layers, and refracts light considerably. By applying iodine and sulphuric acid, after treatment with potash, it quickly turns a bright violet, and afterwards a deep blue. By warming the threads enveloped in cellulose in a solution of potash, and afterwards applying iodine, the cellulose sheath becomes transparent, and allows the double contoured mycelium threads to be distinctly seen in the interior (i, 7).

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The threads inclosed in cellulose resemble little straight ridges which enlarge at their point of contact with the cell wall; they can be traced through many cells (i, 6). Their thickness varies very much, and depends chiefly on the circumference of the mycelium. I found these threads all over in Ust. Maydis, where the mycelium generally occurs in the greatest bulk in the ovary wall, and in the woody parenchyma of the rhachis.

The mycelium passes through the supporting plant, at the beginning, probably uninterruptedly, proceeding from the root or rhizoma to the place of spore formation. In the further growth of the supporting plant, and when the spores are formed, it is very possible that the mycelium establishes itself only in the further growing and developing parts of the new organs; similarly in the roots and nodes. Nevertheless, there appears to be here an important difference in the supporting plants, namely, in monocotyledons the mycelium can be traced through the entire supporting plant; in the dicotyledons I could only detect it with certainty (in many species of Ustilagineæ) in those organs, or in their immediate neighborhood, where the spore formation took place; for example, in Ust. Carbo I found the mycelium in the root itself, and from there through the entire axillary part of the supporting plant, up to the blossom (ii, 3, 4, 2, 5), and more abundant in the nodes and the rhachis than in the internodes. The mycelium of Ust. Carbo was likewise spread through Hordeum distichum, Triticum vulgare, and Arrhenatherum elatius, as well as in Avena sativa. It showed itself most distinctly all over in growing specimens of the supporting plant, and in abundant spore formations. Repeated investigations of the same supporting plant, as well as of different ones, always gave the same result of universal spreading of the Ust. Carbo. It is necessary to remark, in order to prevent misapprehension, that in the statement of the spreading, those organs are excepted, through which it is not necessary for the mycelium to pass in order to get from the bottom of the stalk, through the tissue of the supporting plant, to the place of the spore formation. So in Ust. Carbo the mycelium is found neither in the leaves nor in the root points, although outgrowths of them, which have no relation to the spore formation, are unmistakably present, as in cases where the mycelium also passes over in the awns. In the axillary parts we find this ustilago only within the fibrous tissues. In the panicle it spreads more or less. In the former case it penetrates in all parts of it, not excepting the glumes (ii, 6); in the latter not only a few of the blossom parts remained intact, but generally a few blossoms and

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spikelets. The same happens in the side shoots of the supporting plant. Commonly, also, the shoots are affected by the ustilago as well as the principal stem; though not seldom variously modified exceptions occur. I mention only, that among the side shoots, some are entirely free from mycelium, in others of them it exists, with or without succeeding spore formation. There are also cases known of spore development in the side shoots, exclusive of the principal stem (but whether the latter contained mycelium is not stated).[1]

Ust. hypodytes also has a mycelium easily traced. I found it in the rhizoma nodes with very strong walled coils; in the parenchyma, between the outside and the fibrous tissue. In the uppermost part of the rhizoma, and in the nodes, it is less coiled, nevertheless it is strong walled, and has numerous cross walls, narrow lumen, and is from .0025 to .0035 ^{mm} thick. In the internodes (ii, 7) the mycelium is found .005 ^{mm} in thickness, which even passes into the leaves and continues to grow further, but more sparingly than in proximity to the spore formation.

In Tilletia de Baryana we have a further example of the spreading of the mycelium in the monocotyledons. Here it pervades the rhizoma and the nodes (i, 4) and internodes of the stem. For spore formation it goes into the leaves (ii, 2, 3). The presence of the Tilletia mycelium in young stalk internodes is easier to be observed in the neighborhood of the leaf sheath and nodes; here it encircles the fibrous tissue mostly, even reaching to the parenchyma of the pith. The mycelium of this Tilletia more frequently passes between the cells; that of Tilletia endophylla, on the contrary, chiefly through the cells.

The presence of the Tilletia mycelium in the rhizoma and nodes of *Holcus mollis* is simply and irrefutably proved in the following experiment: I planted in earth rhizomes, as well as different parts of the stalk, of several specimens of Holcus which were attacked by Tilletia. After a few days I not only perceived a mycelium in the newly developed parts, but also spore forming threads from which afterwards normal spores came. A like result was given in de Bary's experiments on the presence and spreading of the mycelium in Sorisporium Saponariæ.

Investigations of the occurrence of the mycelium of Ust. Maydis, showed a very great spreading of it also. I not only found it in the ovary wall, which was filled with spores, but also in the woody paren-

[1] Hoffmann on the Flugbrand, p. 193.

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chyma of the rhachis, on the outside of the pith tissue, and also some internodes lower; in the nodes, almost near the base of the Zea Mays (mostly nearer the surface of the stalk amid the fibrous tissue); it appeared also with many suckers in the parenchyma of the leaves covered with brand pustules.

Ustilagos occurring on dicotyledons show a spread mycelium principally near the place of spore formation. In other parts of the supporting plant, for instance in the root and stalk, it can be found only with the greatest difficulty, because it appears so sparingly at the time when spore forming threads already exist, or the spore formation has commenced. I have had no opportunity to examine it in earlier conditions. I refer particularly here to the multitudes of mycelia I have examined, of Ust. flosculorum, receptaculorum, and partly of Ust. antherarum. Besides, there are, first, strong, thick, woody cells of some tissues; for instance, the rhizoma and nodes of the Knautia arvensis (with Ust. flosculorum), whose cell walls, when cut, have a deceiving resemblance to mycelium threads; and again, the rich protoplasmatic contents, and the not easily removed chyle in Tragopogon (with Ust. receptaculorum), which greatly impede the discovery of the mycelium.

The mycelium makes its appearance in very early conditions of the attacked plant. It grows with the supporting plant and spreads with and in it, in order to arrive at the place of spore formation. This was shown very distinctly in experiments with rhizomes cut from *Holcus mollis*, in which mycelium of Tilletia de Baryana existed. Planted in earth they took root easily and produced shoots, in which, at the same time, mycelium from the rhizoma made their appearance, which kept pace with the further growth of the shoots until the spore formation began in the young leaves.

In regard to the duration of the mycelium, de Bary's observations of the reappearance of the parasite in the same plant many years in succession, speak for its being perennial in perennial supporting plants. According to de Bary's investigations (verbally communicated), a large plant of Saponaria officinalis growing entirely isolated in the Freiburg botanical gardens, was attacked each summer, for more than ten years, by Ust. antherarum, in all the anthers. Without being willing to draw without exception any over-hasty conclusions from these investigations, I can also mention that I found in the same manner Ust. flosculorum for the second time in the same meadow, mostly in the fullest luxuriance, where it had also appeared in the spring; that is after the first mowing of the Knautia arvensis, as soon

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as the new blossoms had developed. In like manner I observed Ust. Carbo on the after-growth of Arrhenatherum elatius, after plants in the same place, attacked by the parasite in their first growth, had been mowed (I cannot say with certainty whether it was on the same specimen of the supporting plant) the after-growth not only contained mycelium spreading through the entire stock, but also spores in different stages of development.[1]

2. *Spore Formation.*

In those parts of the supporting plant, where the spore formation takes place, are found the spore-forming threads. They come immediately from the mycelium, as branches, and are distinguished by an entirely different appearance and action.

The spore-forming threads commonly have a thickness of from .002 to .004^{mm}. In Ust. antherarum, of Saponaria offic., nevertheless they are scarcely .0001^{mm} thick; on the contrary, Ust. Maydis, in the largest spaces between the cells, attains a thickness of .0012^{mm}. In places, where the spore formation has already begun, they are .008^{mm} and upwards. Their membrane is distended with gelatine; the contents are sparingly fine grained, lustrous, sometimes plainly oleaginous. The difference in the lustre depends on the extent to which the thread has become gelatinous; the more this happens the thread, the more indistinct become the contents. The membrane which has become gelatinous and the granular, or sometimes distinctly oleaginous and abundant, contents shining through it, distinguish it also in its less indistinctly marked form from the mycelium. This difference is very marked in Sorisporium Saponariæ (iv, 7); the mycelium thread changes immediately to the spore-forming part, and the latter is distinguished at first sight by its extensively gelatinized membrane, and the granular contents. In all cases, however, the change is not so abrupt. In Ust. Carbo, Tilletia de Baryana and others, there is a transition form of the mycelium in the spore-forming threads, which is nevertheless always distinguished from the mycelium by the more delicate, or already somewhat gelatinized, membrane, and by the more plastic contents.

Shortly before the beginning of the spore formation, the membrane of the thread swells perceptibly, and the lumen consequently becomes narrower (iii, 20; iv, 2, 8). On the contrary, where this process has begun, the lumen enlarges and the diameter of the thread increases

[1] De Bary examined Ust. Vaillantii Tul. (in Scilla bifolia L.) two years in succession in the same place, and found at the bottom of the bulb (locus), in the stalk and blossoms of the supporting plant a mycelium similar to that of Sorisporium Saponariæ (from unpublished investigations).

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to .008 mm, and even more (iii, 30–32, 40; iv, 5). This feature is shown very distinctly in Ustilago and Sorisporium; in Tilletia neither such an extensive swelling of the membrane, nor such a contraction of the lumen takes place (iii, 1, 6, 9).

The threads are found in the interior of the supporting tissue, or on its exterior surface — everywhere where spore formation takes place. Thus, in Till. endophylla, de Baryana, Ust. longissima, and partly also in Ust. Maydis and Urocystes pompholygodes, in the parenchyma of the leaves, between the fibrous tissue; in Till. Caries, Ust. flosculorum, receptaculorum, antherarum, Carbo, Maydis, urceolorum and Sorisporium Saponariæ, in different part of the blossoms; in Ust. hypodytes on the outer surface of the internodes; in Ust. Maydis likewise in the surface tissue of the stalk, and of the male panicle stems, etc. In some ustilagos the threads occur in very great masses, especially in Ust. urceolorum and Sorisporium Saponariæ.

The application of reagents indicates nitrogenized substances in the contents of the spore forming threads. Iodine colors them a deep yellow; chloride of zinc and iodine a brownish yellow. The membrane remains colorless. In water it swells somewhat, resists weak sulphuric acid, and dissolves only through long influence of concentrated acid. Numerous oil drops are only occasionally found in the contents—the oftenest in Ust. Maydis—especially in the wall of the young ovary of the Zea of nearly 1 centimetre in length (iii, 19). The oil appears the plainest at the beginning of the spore formation, and in that part of the thread where the spore formation will occur next (iii, 20), consequently it serves as a material for the spore formation.

The threads just described form the spores in different ways: either singly on their ends (Tilletia), or they break up into spores themselves (Ustilago); besides, the spore formation of Sorisporium and Urocystis occurs in a peculiar form, which will be further mentioned later.

The spore forming threads of *Tilletia* appear in Till. Caries (in the ovarium tissue of wheat) as principal stems (of nearly .002 mm thick), and secondary stems. The latter are thinner, less ramifying, and the spores form on their ends first. The spore formation occurs in succession, and begins by slender pear-shaped branches of .0015 mm thick, appearing on the side of the principal stem (iii, 1). These outgrowths extend themselves in length from the bottom. The pear-shaped part increases in circumference and becomes more round, by which the under end becomes a little stem, or plainly marked branch, of about .001 mm thick (iii, 1, 3 underside at the right). The latter, at this time, is from .003 mm to .0035 mm long, and from .0025 mm to .003 mm

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thick. The contents coming out of the principal stem shine through the somewhat gelatinized membrane of the little branch. The upper part shows itself distinctly as a young spore in form of a little pustule, which is transparent, roundish, and filled with bright granular contents. Shortly before the completion of the growth this obtains a double contour, indicating the formation of the episporium (iii, 3). By this time the little branch is so exhausted by the spore formation that it commonly appears as a delicate, thin, little winding thread of from .0005 ^{mm} to .001 ^{mm} in diameter, containing vacuoles (iii, 5). Later, the episporium becomes gradually darker and uneven, and the contents become especially rich in oil.

Tilletia endophylla shows a very similar process of spore formation, and needs, therefore, no further description.

Vacuoles are seen in young spores of both species of Tilletia while still transparent, which through the influence of water become perceptibly larger and more numerous (iii, 11). On many of the completely formed spores are seen the remains of the thread.

The spore formation of the Tilletia de Baryana shows a deviation worthy of mention. On the one hand it forms its spores at the end of the threads, like Till. Caries and endophylla; but on the other these threads are larger in circumference and their gelatinized membrane envelopes the spores until their maturity. The free end of the thread which has already changed into a spore, is, at the beginning, compressed to a beak shape (iii, 14), but later becomes round. The gelatinous membrane attains a considerable thickness; but, however, as soon as the spore contents in it separate from it by the firm contour (iii, 15, 16), it begins to disappear more and more until at full maturity of the spores there is no trace of it remaining.[1]

Ustilago shows a different process of spore formation. The spore-forming threads increase in circumference; their lumen contracts and appears filled with the contents, as a shiny narrow stripe (iii, 20; iv, 1, 2); they form numerous shorter or longer branches (iii, 20) and run closer together. The threads swell at several places, more or less near together (iii, 30, 37), in succession, so that the spores may often be seen in all stages of developement at the same time (iii, 32, 36, 39). These roundish or oval swellings occur in connexion with a considerable gelatinizing of the membrane, and an enlargement at the same time of the lumen, which, filled with the contents,

[1] In Till. de Baryana the beginning of spores are found also in the form of small, clear, transparent blisters, with homogeneous watery contents; but on account of their small size and number they may be considered as abnormal conditions.

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mostly appears somewhat pear-shaped or more elongated (iii, 41, 44; iv, 3, 4).

As the result of the local swellings, the contents become broken up into a corresponding number of parts or little lumps (iii, 30, 32, 37). At the same time the contour of the entire thread becomes undulating, and by reason of many lateral and terminal sprouts generally gets a tangled irregular appearance (iii, 36, 37, 39, 40.) Often a swelling on the thread is scarcely apparent, when the contents are already distinctly divided into several parts (iii, 20; iv, 3).

The occurrence of a very large number of spore-forming threads, together with their branches, causes such crowding, that the gelatinous membranes pressing against one another, glue together, and in the further development their contours almost entirely disappear (iv, 5). Under these circumstances the entire bulk of complex threads, intertwisted and glued together, have the appearance of a gelatinous mass, in which are perceived many clear, shiny parts of the contents of the threads, shining through like little short stripes, little lumps, etc. (iii, 42).

The individual parts of the thread soon begin to differentiate (iii, 31, 33). The swellings become rounder and their contents likewise take a rounder form. There follow multitudinous sproutings of the branches, as well as a further separation of the contents of the swellings themselves (iii, 34, 42). Around each of such parts of the contents, the gelatinous membrane becomes larger in circumference. Notwithstanding this irregular production of the spores, however, some threads generally show a spore formation downwards from the point (iii, 31, 39). At this time the circumference of the thread varies greatly; at some places it is from .003 to .004^{mm} thick, at others, where there are larger swellings, from .006 to .008^{mm}. However the thickness and greatness of the threads, together with their spore beginnings, depends upon their species; Ust. longissima, hypodytes, Carbo and flosculorum, show, for instance, smaller dimensions than Ust. receptaculorum, Maydis and urceolorum.

During the later process of the spore formation, the entire mass of the threads always separates more distinctly into single parts, which, however, remain together until the completion of the spores, and, according to their developement, show a more or less thick gelatinous membrane surrounding the clear, shining lumps of the contents. The membrane, together with these lumps, has angular sides throughout, where they were contracted through pressure against the adjacent parts during their formation iii, 34; iv, 6).

The contour of the gelatinous membrane becomes more distinct on

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the exposed side, as well as that of the contents (iii, 23, 45). At the same time the beginnings of spores are seen completely separated from one another. The interior enlarges and contains a multitude of oil drops; the gelatinous membrane shrinks perceptibly. Around the contents a distinct contour is perceived; it corresponds with the outer spore membrane, which assumes a deeper colour. The irregularities of the episporium are formed while still surrounded with a thin gelatinous layer (iii, 35, 46). At the same time the entire mass of spores become perceptibly larger in circumference, and the developed spores separating, take their typical, mostly spheroidal form. Ripe spores show no trace of the gelatinous membrane, or any remains of threads attached to them.

Sorisporium Saponariæ is distinguished by an entirely different spore formation, which, however, by close observation, shows some resemblance to Ustilago.

Extraordinarily abundant mycelium (with threads from .002 to .004^{mm} thick, at the time of the spore formation), penetrates all parts of the blossom. In the immediate neighborhood of the free surfaces of the blossom, not excepting the interior of the ovary, the mycelium changes directly into spore-forming threads (iv, 7), which like those of Ustilago, appear gelatinous, from .004 to .007^{mm} thick, and filled with shining contents. Running on the free surface, these threads have a feature different from Ustilago, that the free ends curve and bend inwards, as if to roll up the point (iv, 10). At the same time branches appear at different places on the threads, which also roll up (iv, 8, 9, 11). The threads, with one or several such branches, incline distinctly toward one another (iv, 9), and twist themselves into a little ball. The membranes of the thread become much more gelatinous; there appear in them hardly perceptible divisions. At the same time other threads appear on the ball, encircle it, and twist themselves into one another, or with the branches of the earlier ones. The whole twisting appears not unlike the formation of the lichen thallus. The gelatinous condition of the membrane, and the great confusion of the threads, cause here also an almost entire disappearance of the contours, which finally are only discerned in a few cases, or at some places on the ball. But it is often possible to trace the lumina filled with shining protoplasm, within the apparently homogeneous gelatinous substance, the contents appearing here also broken into little strips or lumps (iv, 12, 15).

The spore formation in the ball is limited solely to the middle. At the beginnning, where the spores are indistinctly separated from one

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another, it is difficult to get an accurate view of them. Then, clear spots better defined, the beginnings of spores, are usually to be descerned in the interior of the ball. Soon after they separate one from another, showing a distinct contour; they assume a faint light brown color, and appear in one plane of view as from four to sixteen more parts or cells (iv, 12 to 14). Seemingly these spores which now have begun to show themselves, and in fact by repeatedly separating form the real spores, may frequently reach sixty or even over one hundred in one ball (iv, 22). Such spore beginnings, which show angular formations in every place where there is pressure, are already contained in the spore balls of .05 ^{mm} in their greatest diameter.

In the further development of the spores, the ball becomes larger in circumference, the gelatinous threads swell greatly, surrounding the young spores like a gelatinous zone (iv, 15, 16). The contour of the threads can still only be partly perceived near the spore (iv, 15). At a certain stage of the developement, as soon as the spores take a more intense brown color, the gelatinous zone has begun to be absorbed (iv, 15, 16, 21) by being applied to the developement of the spores. Spore balls of .07 ^{mm} in diameter have a gelatinous zone of only from .004 ^{mm} to .006 ^{mm} thick. In ripe spores it entirely disappears (iv, 22).

The spore ball masses show the same peculiarity in regard to the course of their developement as the single thread spores of the ustilagos. For if there exist compact layers, mostly six to eight, of spore balls on the exterior surface of the supporting plant, then the outermost row is composed of the most developed spore balls; those which follow inwardly are made up of less developed spore balls (iv, 20). Probably the first formed layer of spore balls is pressed out by those following, and so on, and can then either develope further independently, or, what is more probable, by many spore-forming threads which have become very much lengthened, remain in connexion with the supporting plant.

Besides the spore balls described, there is found a second form of Sorisporium Saponariæ spores, solitary. Their origin is similar to Tilletia, inasmuch as one spore only forms on single threads. These are strong gelatinized threads of faint lustre (iv, 16), which are observed as branches, or perhaps only the pressed out ends of threads wound round the ball. Or are they threads, which appear in the immediate neighborhood of the ball, coming from the twisting of the threads generally forming spores? I have not been able to ascertain by direct observation.

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The solitary spores surrounded by the gelatinous membrane of the thread are developed similarly to the Tilletia de Baryana. At maturity this membrane disappears entirely, or, although seldom, covers the spore as a very thin layer, hanging together with the remainder of the spore-forming thread. The solitary spores have a roundish form; they appear seldom, and almost always only singly on the ball. Application of iodine, or chloride of zinc and iodine, renders them quite distinct.

Here may be mentioned the oval little bodies of .006^{mm} long and .004^{mm} thick, which are very often fastened to the Sorisporium balls by a small stem generally .006^{mm} long and .001^{mm} thick. In experimental germination these are found to be spores of Pleospora herbarum Rabh.

The spore formation of *Urocystis* (about which there is mention of one or two cases in the historical introduction) I have had no opportunity to examine.

The application of reagents shows nitrogenous substances in the contents of the young spores, the same as in the spore-forming threads. Iodine colors it yellow; chloride of zinc and iodine, brownish yellow. The gelatinous membrane dissolves in sulphuric acid, and is not colored by the above reagents. On the contrary, a solution of potash colors it yellow. In water it expands more in the younger conditions than later. Alcohol causes a great shrinkage not only of the spore-forming threads, but also of the almost completely formed spores. The cited reagents remain the same, without any remarkable distinction, in the different stages of the development of the spore. Sulphuric acid only shows a great quantity of oil drops in the developed spores whose gelatinous membrane has almost disappeared, which then shine through the episporium, or by the bursting of it come out.

3. *Place of the Spore Formation and Developement of the Spore Masses.*

In comparing the different conditions of the spore formation in connexion with the supporting plant, many variations appear.

Tilletia Caries chooses for the spore formation, the ovaries of some of the graminaceæ, especially of wheat (Triticum vulgare). The beginning of the spore formation can be discovered from exterior indications; the ears (of wheat) appear of a darker green, the spikelets stand somewhat away from the stem. If this spikelet is examined, the ovary appears rather swollen, though still oval, by which means it can be distinguished from the round swelling one, infested by the

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Anguillula Tritici Kühn. In the ovary only, a light grey pappy mass is found. It consists of spore-forming threads and many young spores, which are mixed with more developed ones, provided with the scarcely coloured episporium. At this time, a distinct mycelium pervades the wall of the germ, which later, can be followed to, and in the stem. Generally, the shrunken anthers rest on the ovary, in which appear a few complete, but withered grains of pollen.

The presence of the parasite is marked more conspicuously in the further perfection of the spores; the growth of the affected ear, is slower than the normal ones; its colour is still green, when the others have become yellow; the spikelets appear sparingly, and the entire plant has a stunted growth. In the ovary the spore mass is of a greyish black color, of less moist consistency, and has a characteristic odour. Among the clear brown ripe spores, many are found that are limpid, although already of from .016 to .02 ^{mm} in diameter. Entirely ripe spores appear as a brownish black powder. They often burst the ovary. The ear turns yellow.

The *Tilletia endophylla* forms its spores in the leaf parenchyma of Brachypodium pinnatum. The youngest conditions are best found in the side shoots of an affected stock, whose leaves are still rolled up. The innermost of them, contain the youngest stages, which are indicated on the outside of the leaf, by rather pale yellowish or brownish stripes. A long incision of tender leaf shows spore-forming threads plainly, particularly between the cells, with oil drops in the contents. Spores are here also to be seen, later, as clear pustules; they are distinctly separated from one another, and not piled together, as in ustilagos. Later the spore beds appear as reddish-brownish, much lengthened stripes, more developed, and mostly containing light colored spores. Here the spore formation also takes place from the exterior, towards the interior of the tissue. At last the epidermis bursts, and in the openings is seen a brownish black powder, which consists only of ripe spores. The spore masses possess the same disagreeable odour, as Tilletia Caries.

The spores of the *Tilletia de Baryana* are found in the parenchyma of the leaves, and in the sheath of the leaves of holcus mollis (velvet grass). The spore masses appear, according to their ripeness, as more or less long narrow stripes of a brownish-black colour, often extending from the sheath of the leaf, to the point between the leaf-nerves, mostly covered only by the epidermis. At maturity, the surrounding tissue of the supporting plant, appears to wither and becomes brownish-yellow or red; it is bursted open by the spore masses, upon

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the upper and under side of the leaf and leaf sheath. The edges of the leaves retain their green colour the longest. Exterior appearances correspond with the different stages of the spore formation, as in the Tilletias already mentioned. The spore masses possess no odour.[1]

The spore formation of the Ust. flosculorum occurs only in the anthers of the Knautia arvensis. The beginnings of the spores are found already in the youngest blossoms which admit of a close examination, when scarcely the size of a pin head. The space in the anther-chamber is already filled with the gelatinous spore-forming thread texture, sometimes mixed with the pollen mother cells and developed pollen grains. Abundant mycelium threads penetrate the wall of the anther, and are evidently in connexion with the spore-forming texture; I have found none in the stalk.

In the interior of the closed blossom the anthers are found sprung up with normal splits in them, and covered with a whitish mass, which generally is formed of half-ripe spores, still surrounded with the gelatinous membrane and very young spores. In the full grown blossom all the spores of the parasite are ripe. The parts of the blossom, with the exception of the already withered anthers have, on the whole, a structure differing scarcely from the normal one, the ovule especially, some of the pollen grains even coming to a regular developement. The blossom remains closed for a very surprisingly long time, and the points of the corolla segments become often early faded and withered. The entire colour of the blossom crown is changed by the plentiful sprinkling of the violet-coloured spore powder; the head has a bright violet tinge.[2]

Ust. antherarum in like manner forms its spores in the anthers, and only in the different species of Sileneæ. Mycelium and spore-forming threads are often found in very young anthers; Saponaria blossoms of only 1½–2 millim. long, with anthers ½–¾ of a millim. long, contained already a gelatinous mass of indiscriminate spores and spore-forming threads; at the same time, pollen, which afterwards disappeared. Blossoms of from 3–4 millim. long already appear somewhat swelled, and in them is seen the characteristic violet-coloured spore mass coming from the opened anthers. It consists mostly of ripe spores, furnished with a coloured episporium, with which are mixed many younger gelatinous spores. This causes the entire mass to have a soft moist

[1] This new Tilletia I found last summer, in the greatest luxuriancy, in the ditch on the right of the highway near Freiburg (Baden), in the direction from St. Loretto, towards Guntersthal. Prof. de Bary and myself, found isolated species of the attacked Holcus, also, on the south side of the Schlossberg. The spores ripen in June. See *Rabenhorst*, Fungi eur. exsicc. Cent. x, No. 1073.

[2] Compare Fischer v. Waldheim, contribution to the knowledge of the Ustilago. Botan. Zeit. v. Mohl. and de Bary, 1867, p. 393, sq.

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appearance. Later the blossom opens, the bursted anthers extend on the stalks over the flower leaves, covered with a violet spore powder. Spores coming from here cover here and there, as little powdered spots, single parts of the blossom.

Ust. antherarum shows the same characteristics in Lychnis Flos cuculi, diurna, Dianthus Carthusianorum and Silene inflata. Only the proportionate size of the blossoms in which a certain stage of spore development is met with, is evidently different in comparison with Saponaria officinalis.

Ust. receptaculorum developes its spores on the outer surface of the receptacle and of the blossoms of Tragopogon pratensis, porrifolius, and Scorzonera humilis. My observations refer to Tragopogon pratensis.

The presence of the parasite can be detected also here by the swelled up appearance of the young blossom yet enclosed in the calyx. If such an one of from 4–5 millim. in diameter is opened, all of the receptacles as well as the blossom appear covered with a bright rosy violet, doughy layer. There are already, at this time, spores with small perfected episporium, however they almost all have yet a gelatinous membrane. A cut, vertical to the receptacle of the flower, shows how the spore formation proceeds from the exterior toward the interior, the ripest conditions lying nearest the exterior, while down toward the upper surface of the receptaculum the spores are by degrees less developed. Later, when the blossom buds have become not quite double in size, the calyx still remains closed. Receptaculum and blossom appear then covered with a dark violet powder. A horizontal cut through the first shows, below the almost perfect spores, others whose gelatinous membrane has already begun to be absorbed. At last the still green and strong calyx leaves separate, but retain their former position, in which they bend together. Through the openings comes a rich, dark, brownish violet powder of ripened spores.

Ust. urceolorum forms its spores exclusively on the upper surface of the ovary of different species of Carex. I found them alive while examining the Carex pilulifera. The mycelium of the fungus is found spread through the entire ovary, as well as in the ovary wall, and in the tissue of the shrunken ovule, as also in the hollow spaces, which are caused by the shrinkage of the ovule, between its upper surface and the ovary wall, and between the kernel and integuments. On the contrary, I did not find the mycelium in the pericarp surrounding the ovary.

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The spore-forming threads, pass on the outer upper surface, for the purpose of spore formation, and are here developed into a thick layer, overspreading the ovary wall, in which the spore formation begins, on the outside, and proceeds inwardly towards the ovary wall. Here are found still early stages, while the outer surface consists of dark, completed spores. Such a spore bed, when cut horizontally, commonly shows two layers of spores, distinctly separated from one another, one dark and glossy, which, with the exception of the fastening place of the stem, uninterruptedly surrounds the ovary. The former consists of almost ripe spores, and is from .48 to .56 ^{mm} thick; and the latter, contiguous to the ovary, of gelatinous spores, is from .04 to .06 ^{mm} thick. With the perfection of the spore-forming fungus bed, the volume of the body inclosed in the urceolus is evidently increased even to double the normal size of the carex fruit. The skin itself bursts longitudinally, and the fruit, covered with the fungus, appears as a dusty ball.

In one and the same ear, either all the seed may be affected with the parasite, or only a few, often even only one, while the remainder appear normal and sound.

Ust. Carbo spore formation takes place exclusively in the blossoms of some Graminaceæ. This parasite usually attacks all the organs of the spike, although cases of a more partial infection are not infrequent.

Oat blossoms of 1½–2 millim. long (the covering-leaves being omitted) already contained mycelium. On the outer surface, or generally on the upper surface of some spikelets, about ½ cent. long, appear roundish, encircled, gelatinous masses. These latter, contiguous to the supporting tissue, cause small holes in it, and consist of spore-forming threads run together, with spore beginnings. Larger blossoms, approaching 1 centimetre in length, contained brownish-coloured spores, which, as a brownish-black powder, covered a few organs; besides spores still with their gelatinous membrane. The undermost spikelets, nearest the stem, are the least developed, and contain younger spore conditions, than the upper ones.

In the further development of the spores, the involucre is destroyed, and the brown-black powdery spore mass is spread over the naked blossom organs. These conditions are already found in panicles, which are still completely enclosed by the sheath of the leaf.

Hoffmann mentions a fine mycelium of Ust. Carbo of barley and oats, which in some cases spins around the still wrapped up ear like a spider-web, and binds it to the sheath of the leaf.[1] I have often had

[1] On Dust Brand, p. 200.

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opportunities to examine similar conditions of barley and oat brand, but in all my cases the kind of cobweb mycelium proved to be entirely heterogeneous, not having the least generic connexion with Ust. Carbo. It originated mostly from luxuriantly developed Acrostalagmus or Verticillium. I never found mycelium of Ust. Carbo on the young spore beds.

Ust. Carbo shows similar relations during the spore formation in other supporting plants; a description may therefore be omitted.

The commonest place of the spore formation of *Ust. Maydis* is the interior of the ovary of Zea Mays. The ovary appears then of an abnormal, spongy form, also with a length of 1 centimetre. In the interior of its wall, but nearer the outer surface, are found separated pale brownish spots, formed of gelatinous spore masses. Those spore-forming threads which are not run together, appear of from .003^{mm} to .007^{mm} thick, sometimes even up to .012^{mm}, and have rich oleaginous contents. They pass mostly between the cells, but often penetrate them, themselves or with their shoots. At the same time there come not unfrequently, long, somewhat gelatinous-appearing, isolated and septate threads on places where spore formation can take place. It remains to be decided whether it is not a certain transition state of the spore-forming threads (iii, 17).

A cut along the ovary shows the single spore formation mass as dirty brown spots (iii, 24), which, by the further developement of the spores, increase in numbers, become larger and darker colored. The texture of such an ovary already becomes abnormally large, appears very loose, spongy and porous. The latter itself is of a changed form, swelled up and hanging over towards the outside. Such conditions are found on an ovary of about two inches long and half an inch broad. They are by no means confined to a definite size of it, for the appearance, number, etc., of the spore-formation masses depend on the abundance in which the latter appear and the degree of their developement.

The peculiar manner of the spore formation of Ust. Maydis explains the origin of isolated spore masses. The spore-forming threads form very numerous ramifications (influenced perhaps by the large tender cells of the Zea tissue), which, however, develope in a more tufted form on certain places of the thread. In each tuft, or in the ramifications arising from it, begins a spore-formation process isolated from the rest. So originate the isolated spore masses; the spores ripen in them in a centripetal direction. In consequence of the large-celled supporting tissue, the single spores suffer a slight mutual pressure,

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and on that account appear of a spheroidal form, and are hardly distinguishable from one another (a somewhat advanced stage is shown in iii, 21, 22).

As the ramifications become more numerous, and later the incipient principal threads separate into spores, the spore-formation masses increase extraordinarily, and, luxuriantly developing, entirely fill the texture of the ovary which more and more diminishes. Only the cells of the outer wall remain complete. The developed spores appear like a greasy, brownish black mass, which breaks through the ovary when ripe.

As to the ovary itself, it should be mentioned that at the beginning of the spore formation the ovule becomes hypertrophied and appears filled with spore-forming threads. Later, it is destroyed, the same as the rest of the texture.

Ust. Maydis forms its spores also in other parts of the supporting plant; for instance, often in the internodes of the male and female axes; more seldom in the surface tissue of the nodes (where I have observed brand protuberances as large as a hen's egg), at the bottom of the leaves, and in the texture of the leaf laminæ. The attacked places, under these circumstances, likewise appear hypertrophied and swelled up, filled with a multitude of spores and growing to a large size.

The spores of *Ust. Hypodytes* occur on the outer surface of the main stem (except the nodes); also on the inner surface of the leaf-sheath, and the under parts of the leaves, especially on Elymus arenarius. The attacked plants may be distinguished by the following: Backward growth, the stem remaining unusually long rolled up in the leaves, which are shorter and blunter than usual, and appear swelled in consequence of the developing spores between them and the stem. In the specimens, I have examined, the ears did not develope.

If the younger conditions of the spores are investigated, a horizontal cut, in an affected internode, shows the mycelium in the cells lying nearest the outer suface (iii. 26). Its threads are distinguished by very many cross walls, and by their undulating course, especially in the inner wall of the cells. A transition form, in the spore-forming threads of a slightly gelatinous nature, is found in the two outer rows of the stem cells. When these threads have penetrated the free surface of the stem, they become much more gelatinous, although only measuring .002 ^{mm}, or, on places where the spore formation begins, .004 ^{mm} thick (iii. 25). In consequence of such a small

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diameter of the intertwisted threads, the lumen can scarcely be perceived. The spore formation of this Ustilago also proceeds from the exterior towards the interior—towards the surface of the stem and leaves. As soon as the outer layer is composed of ripe spores, and amounts to a thickness of .2^{mm}, the later layer lying nearest the surface of the supporting plant contains mostly unripe spores, clear as water, and measures .04^{mm} in thickness.

Ripe spore beds surround the internodes, generally excepting the two lowest ones, as a compact, greenish-brown, pulverized covering, and, from the bottom to the top, where the youngest stages are found. Thus, for instance, eleven internodes, counted from the top, are covered with spores, and only the two lowest ones remain free.

Ust. longissima forms its spores in the parenchyma of the leaf of some Glycerias. The youngest stages are seen in the form of clear pale yellow spots or stripes on the not yet unrolled leaf. A proper cut, at such places in the texture of the leaf, between the woody tissue, shows a rich texture of spore-forming threads. They pass through the cells in several rows; the principal threads are from .006 to .01^{mm} thick, the branches are from .003 to .004^{mm} thick. The latter appear in this stage mostly as already run together, and forming a gelatinous mass, with little lumps of the contents shining through.

The spots and stripes enlarge during the further developement of the spores, chiefly in length. At the same time they become darker coloured. Such conditions are seen on leaves of about four or five inches in length, already out of the sheath. Here the most of the spore beginnings are plainly different, surrounded with a thin gelatinous membrane, and with yellow shining lumpy contents (iii, 27, 28). The interior of the spore masses contains the youngest conditions. When the spores become ripe, the epidermis of both surfaces of the leaf bursts at the stripes, and the spores fill up the opening as a dirty greenish-brown powder.

Sorisporium Saponariæ spore balls originate on all parts of the free surfaces of the blossom inclosed by the calyx of Saponaria officinalis (sometimes also on the inner surface of the bottom of the calyx). Blossoms of one millimetre in diameter, as soon as they contain the parasite, appear somewhat swelled at the bottom. In them is found merely an abundant gelatinous skein of spore forming threads, which pass along in the immediate neighborhood of the free surfaces of the several parts, and with numerous ends come to the surface itself. Mycelium also occurs there. Blossoms of two millimetres in diameter show very many formed spore balls in various stages of developement, and young

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solitary spores, but only seldom, as is the case also later. The Sorisporium characteristics of the blossoms at this time are roundish inflated forms, and closed calyx. The blossoms, already filled with the ripe spores, retain this exterior form; they have a globular-pointed appearance; their greatest diameter is from six to nine millimetres. At the middle, more seldom they are oval or pear shaped, the greatest diameter being ten millimetres at the base. The calyx leaves are mostly pale green, at the point a brownish violet; the flower leaves thickened and short. The threads attain a thickness of one millimetre. The anthers appear white, and with pollen grains; the ovary thickened (to three millim. in diameter), and with an undeveloped style. All these parts, except the outer surface of the calyx, are covered with a brownish rust-coloured spore powder. The spores also fill the inner space of the ovary. Each ripe spore ball appears to the naked eye like an atom.

When the spore mass becomes ripe, the calyx becomes irregularly torn open at the top and sides. It also appears pale green, partly dark violet (especially at the point), or often brownish, with a bright surface and dry skinned. The attacked saponaria scarcely reaches half the height of the sound one, and often has a decumbent stem.

The foregoing observations on the way and manner of the spore formation in reference to the supporting plant allow some general results to be briefly stated.

1. The spore formation takes place only in definitely fixed parts of the supporting plant. I refer especially to Tilletia Caries, endophylla de Baryana, Ust. hypodytes, longissima, Carbo and Sorisporium Saponariæ. Ust. Maydis is an exception, forming its spores on the different parts above the ground, even on the same individual supporting plant. Probably Urocystis pompholygodes should be included, as its spores originate in different parts of the stem and leaf of Helleborus, Ranunculus and Anemone.

2. The spore formation begins in the youngest conditions of the supporting plant. As example, I mention Ust. flosculorum, Carbo, Sorisporium Saponariæ, etc. But the spore-forming threads appear already at the time when the developement of the part of the supporting plant relating to them first begins (for example, Ust. Carbo).

3. With few casual exceptions the parasite is spore forming in *all* its parts which allow spore formation, or, to express it more distinctly, in those parts of the supporting stock which are destined for it, as well in those cases where the remnants of the mycelium may be found, as where it cannot be found. In order to illustrate these conclusions,

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I bring forward the following facts. The spores of Tilletia Caries form, according to their individual capacity, in the ovary of wheat. Generally all the sprouts of the attacked stock contained the parasite, and all the ovaries of a spike its spores. The same happened in Ust. Carbo, and all other Ustilagineæ, so far as their spore formation is known. In some of them (for instance, Ust. Carbo and Till. de Baryana) I succeeded in following the mycelium through the entire supporting plant, from the base to the place of spore formation, and thereby showing that the mycelium grows radiating from the root or root stock of the supporting plant, through all the sprouts toward the places of spore formation, and may be discovered here when the spore formation takes place. In other cases, as in Ust. flosculorum, receptaculorum, etc., this was not possible; in these species, and only seldom, there were scarcely perceivable remnants of the mycelium at places not immediately bordering the place of the spore-forming masses. Notwithstanding which, the spore formation took place here, as before, not only in all the proper places but in all in which it was possible. Exceptions often occurred; they were, however, caused by insufficient and delayed developement of the parasite, or by many other yet uninvestigated circumstances.

4. Not only those parts of the supporting plant, above the ground, contain mycelium, but also those under it; the spore formation, however, takes place only in parts above ground, both in the interior and on the exterior of the texture. Only two species are exceptions; one of them completes its entire life cycle under the earth (Ust. hypogaea, Tul., in the root of Linaria spuria, Mill.[1]), the other, under water (Ust. marina, Dur., in the texture of Scirpus parvulus, Rom. et Schult[2]).

5. The spore-forming masses of all Ustilagineæ have a defined succession of spore formation. As in the single thread of a Ustilago, so also in its entire texture, a centripetal process of formation is distinctly recognized. The spores on the exterior are the ripest; those on the interior are the least so. This is plainest in Ustilago; not less so in Tilletia (only in relation to the entire spore masses); likewise in Sorisporium, only here spore balls represent the single spores.

[1] *Tulasne*, Fungi hypogaei, 1862, p. 196.
[2] *Tulasne*, Super Friesiano Taphrinarum genere. Ann. d. Sc. Natur. V. ser., t. v, 1867, p. 133–136.

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SYNOPSIS OF THE USTILAGINEÆ IN RELATION TO THEIR SUPPORTING PLANTS AND THE PLACE OF THEIR SPORE FORMATION.[1]

[Those personally observed are marked *.]

1. USTILAGO HYPODYTES, FR.

SUPPORTING PLANTS.	PLACE OF THE SPORE FORMATION.
Agropyrum repens, P. B. *Elymus arenarius, L. Glyceria fluitans, R. Br. *Lygeum sp. (Ust. Lygei, Rabh. = Ust. hypodytes). Panicum repens, L. Phragmites communis, Trin. Triticum vulgare, (?) Vill.	*Exterior surface of the main stem and sheaths of the leaves.

2. UST. LONGISSIMA, LEV. (Ust. fusco-virens, Ces.)

Glyceria aquatica, Prsl. " *fluitans, R. Br. " *spectabilis, M. K.	*In the lamina of the leaf, next the outer surface.

2a. UST. LONGISSIMA VAR. MEGALOSPORA, Riess.

Dactylis sp. *Poa sp. } Riess; with spores of $\frac{1}{100}'''$.	*In the leaf parenchyma.

3. UST. CARBO, TUL.

Aira caespitosa, L. Andropogon hirtus, L. *Arrhenatherum elatius, P. B. Avena flavescens, L. " pubescens, L. " *sativa, L. Brachypodium ciliatum, P. B. Cynodon Dactylon, L. Festuca pratensis, Huds. Hordeum distichum, L. " murinum, L. " *vulgare, L.	*On the free surface of some parts of the blossoms (excepting the glumes).

[1] From personal observations and materials contained in the Herbariums of *De Bary*, *Fuckel*, *Klotzsch* and *Rabenhorst*, and in writings mostly cited in the introduction.

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Lolium perenne, L.
" temulentum, L.
Melica sp.
Triticum scabrum, R. Br.
" *vulgare, Vill.

3a. UST. CARBO VAR. COLUMELLIFERA, TUL.

Panicum colonum, L. Pennisetum cenchroides, Rich.	In the interior of the blossom at the place of the ovary.

4. UST. DIGITARIÆ, Rabh.

Digitaria sp.	*On the outer surface of the blossom and the *axis of the spike (destroys the spike).

5. UST. TYPHOIDES, B. *a.* Br. (Ust. grandis, Fr.)

*Phragmites communis, Trin. Typha minor, L.	In the *stems and *sheaths of the leaves.

6. UST. CANDOLLEI, Tul.

Polygonum alpinum, All. " Bistorta, L. " *Hydropiper, L. " viviparum, L.	*In the interior of the globular formed, swollen ovary (with a columella and peridium).

6a. UST. CANDOLLEI VAR. *a.* BERKELYANA, Tul.

Polygonum sp. (southern Asiatic species).	In the interior of the ovary (same as above).

7. UST. PHŒNICIS, Cord.

Phœnix dactylifera, L.	In the fruit.

8. UST. FICUUM, Rchdt.[1]

Ficus Carica, L.	In the peduncle (coenanthium); destroys the fleshy parts.

9. UST. GRAMMICA, B. *a.* Br.

Aira caespitosa, L. Glyceria aquatica, Prsl.	On the stems.

10. UST. SALVEII, B. *a.* Br.

Dactylis glomerata, L.	On the upper surface of the leaf.

[1] See Verh. d. zool., botan. Gesellsch. in Wien, 1867, p. 335.

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11. Ust. marina, Dur.

Scirpus parvulus, R. Sch.	*In the roots.

12. Ust. Ischaemi, Fckl.

*Andropogon Ischaemum, L.	*On the outer surface of the spikelet (destroys the blossom) parts.

13. Ust. hypogaea, Tul.

Linaria spuria, Mill.	In the upper part of the roots.

14. Ust. urceolorum, Tul.

Carex *brizoides, L.	*On the outer surface of the ovary.
" capillaris, L.	
" clandestina, Good.	
" digitata, L.	
" ericetorum, Poll.	
" ferruginea, Scop.	
" firma, L.	
" flava, L.	
" *glauca, Scop.	
" Michelii, Host.	
" montana, L.	
" ornithopoda, Willd.	
" panicea, L.	
" paniculata, L.	
" pilosa, Scop.	
" *pilulifera, Scop.	
" *præcox, L.	
" Pseudo-Cyperus, L.	
" pulicaris, L.	
" rupestris, All.	
" Schreberi, Schrk.	
" stellulata, Good.	
" *supina, Whlbg.	
" *sylvatica Huds.	
Elyna spicata, Schrd.	

15. Ust. Montagnei, Tul.

*Rhynchospora alba, Vahl.	*In the ovary.
Schoenus sp.	

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15a. Ust. Montagnei var. major, Desm.

*Rhynchospora alba, Vahl.	*In the ovary.

16. Ust. vinosa, Tul.

Oxyria reniformis, Hook.	In the receptacle of the flower.

17. Ust. Vaillantii, Tul.

Muscari comosum, Mill. Scilla anthericoides, Poir. " *bifolia, L. " maritima, L.	In the *anthers and *pistils (de Bary).

18. Ust. olivacea, Tul.

*Carex riparia, Curt.	*In the interior of the ovary.

19. Ust. Maydis, Lev.

*Zea Mays, L.	In the *ovary, *stems, *axis of the spike, masculine blossoms, and in the lamina of the leaf.

20. Ust. Schweinitzii, Tul.

Zea Mays, L.	In the spikes.

21. Ust. Dregeana, Tul.

South African grasses.	On the branches of the panicle.

22. Ust. destruens (Schltd.), Duby.[1]

Dactyloctenium ægyptiacum, Willd. *Panicum miliaceum. L. " repens, L. *Setaria glauca, P. B.	In the ovary.

23. Ust. secalis, Rabh.

Secale cereale, L.	In the ovary.

24. Ust. bromivora m. (Ust. Carbo. var. bromivora, Tul.)

*Bromus secalinus, L., and other species.	*On the ovary and *especially in the blossom.

[1] Later addition: *Ust. neglecta*, Niessl. Mpt. (Bot. Zeit., 1868, p. 560), according to the characteristics specified, is nothing else but Ust. destruens.

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25. Ust. flosculorum, Fr.

*Knautia arvensis, Coult.	*In the anthers.

26. Ust. Antherarum, Fr. (Ust. violacea [Pers.] Fckl.[1])

*Dianthus Carthusianorum, L. Gagea lutea, Schult. (according to Unger and Kühn). *Lychnis diurna, Sibth. " *Flos. cuculi, L. " vespertina Sibth. *Saponaria officinalis, L. *Silene inflata, Sm. " nutans, L. " *Otites, Sm. " *rupestris, L. Stellaria graminea, L.	In the anthers and, according to *Tulasne*, also in the stigma-papillæ, as well as in the parenchyma of the point of the ovary, the filaments and blossom leaves

27. Ust. receptaculorum, Fr.

*Scorzonera humilis, L. Tragopogon porrifolius, L. " *pratensis, L.	On the outer surface of the *blossom receptacle and the *blossom.

28. Ust. utriculosa, Tul.

Polygonum Hydropiper, L " *lapathifolium, L. " minus, Huds. " *Persicaria, L. Rumex acetosella, L.	At the bottom of the inner surface of the perianth, in the ovary and at the base of the stamens.

29. Ust. Duriaeana, Tul.

Cerastium glomeratum, Thuill.	In the capsule.

30. Ust. Cardui, m. (n. sp.)

*Carduus acanthoides, L.	In the ovary.

31. Tilletia de Baryana, m. (n. sp.)

*Holcus mollis, L.	*In the lamina of the leaf, near the outer surface.

[1] Later addition: *Ust. Holosteï*, de By. (n. sp.); spores from .011 to .013 mm. in diameter, round, transparent rose-violet, net-formed thickenings, mostly six-cornered, not entirely regular squares. Spore powder dark violet. Discovered by de Bary, at Halle (on the Saar), in April, 1868, on the anthers and ovary of the Holosteum umbellatum, and very kindly communicated to me by him.

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32. TILL. ENDOPHYLLA, de By. (Uredo olida Riess M. spt.)

*Brachypodium pinnatum, P. B.	*In the parenchyma of the leaf, next the outer surface.

33. TILL. CARIES, Tul.

Aira caespitosa, L.	In the ovary.
Bromus secalinus, L.	
Hordeum murinum, L.	
Poa pratensis, L.	
*Triticum monococcum, L.	
" sativum, Lam.	
" *Spelta, L.	
" *vulgare, Vill.	

34. TILL. SORGHI VULGARIS, Tul

Sorghum vulgare, Pers.	In the ovary.

35. TILL. LOLII, Auersw.

Lolium perenne, L.	In the ovary.
" *temulentum.	

36. TILL. SPHAEROCOCCA (Rabh.) M. (Till. Caries, Tul., var. β Agrostidis, Awd.)

*Agrostis vulgaris., With. var. pumila, L.	In the ovary.
Apera Spica-venti, P. B.	

37. SORISPORIUM SAPONARIÆ, Rud. (Sorosporium Sap. Rud.)

Dianthus Carthusianorum.	*On the free surfaces of all parts of the blossom, excepting the surface of the calyx.
Gypsophila, sp.	
Lychnis dioica, L.	
*Saponaria officinalis, L.	
Silene inflata, Sm.	
" velutina, Pourr.	

38. USTILAGO CAPSULARUM, Fr. (Thecaphora hyalina, Fingerh.)

Calystegia sepium, R. Br.	In the seed involucre and on the outer surface of the anther wall.
" Soldanella, R. Br. (Ann. Mag. nat hist., 3 ser., v. 18, p. 121.)	

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39. Urocystis parallela (B. a. Br.) m.

Carex sp.	The stems, leaf sheaths and leaves.
Secale cereale, L.	

40. Uroc. pompholygodes, Rabh.

Anemone sp.	In the *stem, *leaf stalk and *lamina.
Ficaria ranunculoides, Roth.	
*Helleborus viridis, L., var. atrovirens among others.	
*Ranunculus bulbosus, L.	
" *repens, L., among others.[1]	

41. Uroc. occulta, Rabh.

*Secale cereale, L.	In the *stem, *leaf sheath, and *ovary.
Triticum vulgare, Vill.	

42. Uroc. Agropyri m. (Uredo Agrop. Pers.)

*Carex acuta, L.	In the *leaves and *stem.

43. Uroc. Colchici, Rabh.

*Colchicum autumnale, L.	*In the leaves.
Scilla sp.	

44. Uroc. violæ (B. a. Br.) m. (Sorosporium schizocaulon Violæ, Ces.)

*Viola odorata, L.	In the leaves and *petiole.

The following species are known besides[2] (whether they belong to the Ustilagineæ, and represent independent species, I am unable to decide, as I only know them by name.

Ustilago axicola Berk., Caricis Fuck., fœtens Raven., Haesendonckii Westendorp, leucoderma Berk., macrospora Desmaz., Persicariæ Menz., Tritici (Westend. et Wall. herb. crypt. belge).

Sorosporium Scleranthi (Klotzschii herb. viv. myc., Nr. 1481).

Polycystis (Urocystis Rabh.), Filipendulæ Tul., Holci Wstd., Lolii (Bull. de l'Acad. de Belg., sér. xxi, 2, p. 246), opaca Strauss. Polyc. Anemones, Ficariæ and Ranunculacearum (see Fries, Summa. veg. Scand.) is, without doubt, none other, than as Uroc. pompholygodes, Rabh.

[1] The Uroc. Pompholygodes, pretended as occurring in the leaves of Tulipa sylvestris (Rabh. Fungi eur. exs. C. X, Nr. 1099), also known under the name of "Caeoma Tulipæ, Heufl. in sched."), is a new species of endophyte, but by no means a Urocystis, as I was able to see on fresher leaves of the Tulipa, kindly sent to me by Baron von Hohenbuhel-Heufler.

[2] Compare Hoffmann, Index Fungorum, 1863.

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DOUBTFUL USTILAGINEÆ.

USTILAGO PILULAEFORMIS, Tul.

SUPPORTING PLANTS.	PLACE OF THE SPORE FORMATION.
Juncus sp., south African species.	In the ovary.

THECAPHORA ATERRIMA, Tul.

Carex Linkii, Willd.	In the axil of the scale of the male spike.
" praecox, L.	
*Euphrasia sp. (the parasite known as "Sorosporium schizocaulon Euphrasiæ, Ces.)	In the *stem of Euphrasia.

THECAPHORA DEFORMANS, Dur. et Mntgn.

Medicago tribuloides, Lam.	In the cavity of the ovary.

THECAPHORA DELASTRINA, Tul.

Veronica praecox, All.	In the fruit.

THECAPHORA (?) AURANTIACA, Fingh.

Urtica dioica, L.	On the under side of the leaf.

THECAPHORA (?) PALLESCENS, Fingh.

Fragaria collina, Ehrh.	On the leaves.

USTILAGO CYANEA, Rabh.

Balsamia vulgaris, Vitt. (See Botan. Zeit., 1855, p. 287.)	In the interior cavities.

USTILAGO (?) CISSI, Tul.

Cissus sicyoides, L.	In the ovary.

USTILAGO SCLERIÆ, Tul.

Scleria sp. (from Guiana).	In the pedicle, and scales of the spikelets.

Ustil. Monotropæ and Orobanches, Lév., are at present added to the species Tuburcinia, Fr., by *Tulasne* (Fungi hypogaei, page 196).

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STRUCTURE AND APPEARANCE OF THE RIPE SPORES.

The ripe Ustilagineæ spores have an endosporium and an episporium. The former surrounds the contents as a colourless, delicate homogeneous membrane, and comes out during the germination, in the form of a tube, as the promycelium. It is often invisible without the application of sulphuric acid, but by the use of this acid the episporium becomes more transparent, or bursts open, and the inner skin becomes visible. Iodine and sulphuric acid, or a solution of chloride of zinc and iodine, causes no blue cellulose reaction; potash causes a swelling up.

The examination of the structure of the episporium shows a conformity with the episporium of other cryptogamous spores. Here, also, is found either a smooth, homogeneous episporium, or it is provided with various thickenings in form of papillæ, nets, etc., which seldom or never project over the level of it; its greatest part, viewed in the direction of the radius of the spore, is imbedded within the episporium, and it shows only the imperfection of the microscopes of former observers, who describe the thickenings as projecting over it in almost all cases. This is only seldom the case, and when it is so, it occurs in Tilletia de Baryana, Ustilago Olivacea, Maydis, Vaillantii, and, according to Tulasne, also in Ust. Dregeana and Schweinitzii.

The so-called net-formed thickenings appear as connected, narrow, more solid, waterless places of the episporium, and surround many angled, mostly five or six sided, planes or parts, which are watery and often lie deeper than the thickenings. As in other cryptogamous spores, the action of water and various reagents, on the entire episporium and upon a section of it, shows it to be more watery in one place than another.[1]

On the outside, the episporium is enveloped by a cuticle, while by the application of concentrated sulphuric acid the exterior episporium layer not only does not dissolve, but comes out plainer.

The episporium is either colourless, or much oftener of a dirty yellow, brownish, or rosy-violet colour.

The size of the spores, in the largest diameter, amounts to from .004^{mm} (Ust. hypodytes) to .03^{mm} (Urocystis Agropyri). Their form is spheroidal, or elongated spheroidal, or pressed more or less angular and flat.

[1] Compare *Nageli*, Verhalt. d. polar Licht. Sitzungsber. der bayer, Acad. 1862, I. p. 298, sqq.; and *Hofmeister*, Pflanzenzelle, Handb. d. physiol. Botan. I. 1867, p. 199, 200.

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Their contents are composed of protoplasm, with many drops of fatty oil.

The ripe Ustilagineæ spores appear (1st) mostly, as isolated spores, unconnected, and (2d) much more seldom, as spore balls or skeins, in which several spores are united, making a ball or skein. At the same time the spores can be classified according to the structure of their episporium and form as follows:[1]

A. ISOLATED SPORES.

I. WITH FLAT HOMOGENEOUS EPISPORIUMS.

a. *Globular or oval Spores.*

Ustilago hypodytes, Fr. (Ust. Lygei, Rabh.)
" longissima, Lev. (Ust. fusco-virens, Ces.)
" Carbo, Tul. (except the var. d. bromivora, Tul.)
" Digitariæ, Rabh.
" typhoides, B. a. Br.
" Candollei, Tul., } belong also to the following division.
" marina, Dur., }
" Ficuum, Rchdt. (according to Reichardt).
" Phœnicis, Cord., } (according to Tulasne.[2])
Tilletia Sorghi-vulgaris, Tul. }
Ustilago grammica, B. a. Br., } (according to Cooke.[3])
" Salveii, B. a. Br. }

b. *Round and long-angular Spores.*

Ustilago Ischaemi, Fckl.
" hypogaea, Tul. (according to Tulasne)

II. EPISPORIUM WITH AREOLA FORMATION.

a. *With a granulous Episporium.*

Ustilago urceolorum, Tul.
" Montagnei, Tul.
" " var. major, Desm.
" vinosa, Tul. (according to Tulasne).

b. *With papillose Episporium.*

Ustilago Vaillantii, Tul.

[1] More copious details may be found in my published work, "Sur la structure des Spores des Ustilaginees." Bul. de la Soc. Imp. des Natur. de Moscou, 1867, 1, p. 242-261, with a chronological table

[2] 1r. Mem. s. 1, Ustilag. p. 76-117.

[3] *Cooke*, Rust, Smut, Mildew and Mould, 1865, p. 203.

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c. *Episporium with isolated points.*

Ustilago olivacea, Tul.
" Maydis, Lév.
Tilletia de Baryana, m.
Ustilago Dregeana, Tul., } (according to Tulasne).
" Schweinitzii, Tul. }

d. *Episporium with net-formed thickenings.*

Ustilago destruens, Dub.
" bromivora, m.
" Secalis, Rabh. (according to Kühn).
" antherarum, Fr.
" flosculorum, Fr.
" receptaculorum, Fr.
" utriculosa, Tul.
Tilletia endophylla, de By.
" Caries, Tul.
" Lolii, Awd.
" sphaerococca (Rabh.) m.
Ustilago Cardui, m.
" Durieæana, Tul. (according to Tulasne).

B. SPORE BALLS.

I. The Spores composing them uniform.

Sorisporium Saponariæ, Rud. (Ust. Rudolphii, Tul.)

II. The Spores not uniform.

Urocystis pompholygodes, Rabh.
" occulta, Rabh.
" Agropyri, m.
" Colchici, Rabh.
" Violæ (B. a. Br.) m
" paralella (B. a. Br.) m. (according to Cooke).

5. Germination of the Spores.

Ustilago spores germinate in many different ways; for the most part still unknown.[1] The spores of some species only germinate after many hours, and under certain precautions (Tilletia, Urocystis);

1 At present (including my investigations) the germination of the following twelve varieties is established: Till. Caries, Lolii, Ust. antherarum, flosculorum, Carbo, destruens, Maydis, receptaculorum, longissima, Vaillantii, Urocystis pompholygodes and occulta.

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others, easily, and after a few hours (Ustilago). The duration of the capacity of germination varies likewise according to the species.[1]

For the normal germination of the different species of Ustilago, a certain quantity of water or moisture is usually necessary. For this purpose the spores need only be placed in a drop of water, or upon moistened earth, or even merely in an atmosphere kept moist; for instance, under a glass globe placed over a dish of water. But Tilletia and Urocystis germinate only in damp air (for instance, under the glass globe mentioned), and their germinating spores coming in contact with water only show abnormal appearances.

I have used in the following germinating experiments freshly gathered spores, and seldom those gathered from one to one and a half months before.

Ustilago flosculorum germinates in warm weather (16–20° R. in June), under the most favourable circumstances, after 5–6 hours.[2] At the commencement of the germination the endosporium comes through a small opening of the bursted episporium like a tube. At the base this tube — the promycelium — is somewhat smaller than in the other, almost uniform, part, and rounded at the point (v, 47); the contents appear slightly glossy, in some places more grumous. The promycelia in a short time lengthen perceptibly, and increase little in thickness. In from fifteen to eighteen hours from the sowing, they are from .018 to .022^{mm} long, and from .002 to .004^{mm} thick, and filled with coarse grained contents (v, 48 *a*). At the same time sporidia — branches of the promycelium — likewise appear, filled with granular contents (v, 48 *b*, *c*). The sporidia begin as little projections with a very small base, coming from the promycelium, whose protoplasm comes partly over in them. After they attain a certain length they become separated at the base, and complete. At the time mentioned generally a terminal sporidium appears (of .004^{mm} long and .002^{mm} thick), and one or two lateral sporidia (of .006 to .007^{mm} long and .002 to .004^{mm} thick). Secondary sporidia frequently grow from the primary of .0035^{mm} long and .0015^{mm} thick. The spore itself is emptied, and collapses. Sowings made under the same germination conditions showed, however, great variations as regards size. A sowing of the 19th June, after twenty-four hours, had promycelia of .02^{mm} long, and from .003 to .004^{mm} thick (toward the point) as well as primary sporidia of from .004 to

[1] See *Hoffmann*, Unters. uber d. Keim, d. Pilzporen. *Pringsh.* Jahrb. ii, p. 321, sqq.; and *de Bary*. Morph. und Physiol. d. Pilze, p. 209, sqq., where this subject is treated more copiously.

[2] They germinate most favourably in warm, damp, cloudy weather. Fresh spores in most cases germinate the quickest.

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.006^{mm} long, and .003^{mm} thick. But a second sowing, made under the same conditions, and after the same number of hours, showed promycelia mostly of .036^{mm} long, and at the point of .0025^{mm} thick (at the base .0005^{mm} thinner) with primary sporidia of .01^{mm} long, and .004^{mm} thick, whose secondaries were .004^{mm} long, and .002^{mm} thick.

In Ust. flosculorum the formation of the secondary sporidia from the primary is very easily traced, while the latter is still fastened to the promycelium; also the vacuoles which originate still later. After twenty-four hours, and in other sowings a few hours earlier, four large, nearly round, bright glossy vacuoles are seen in the promycelium. Between each two of them cross walls of the promycelium soon distinctly appear (v, 49 *a*, *b*). However these cross walls appear here, as also in other Ustilagos, before the formation of the sporidia and vacuoles, but are often invisible without the application of reagents. But if the promycelium is treated with iodine, the contents, which usually have separated into four parts, show a division which has already taken place. More seldom a greater number than five or six vacuoles is shown (v, 50). The formation of the sporidia precedes the vacuoles, and continues later. The complete vacuoles take up nearly the entire space inside of each of the four parts of the promycelium. Such promycelia remain connected with their spores until the seed decays.

The sporidia appear mostly on the side of the promycelium, at the places of division, either singly or in pairs. Sometimes they occur (also when single) immediately after the germination, in from six to seven and a half hours from the seed, on promycelium of hardly .008^{mm} long. Later their number and dimensions become larger. Sporidia also occur not only on the point, but also on the side of the promycelium, often some of them opposite to one another, or irregularly between each of the two divisions of the promycelium, or several (three or four) surround it in the same plane (v, 52).

The number of sporidia is variable. Generally, after twenty-four hours, there are found on the promycelium from two to four lateral and one terminal, which later detach secondary ones, and remain attached to it still one or two days. In other sowings they sprout again much more abundantly — to the number of from five to seven lateral, and two to four terminal, to be seen at the same time on the promycelium (v, 52).

Generally the dimensions of the sporidia are the largest when only a few of them have separated from the promycelium. Besides the

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above mentioned, there occur cases (for instance, thirty-nine hours after the seed) where the primary, lateral sporidia attain half the length and nearly the thickness of the full grown promycelium, and at the same time detach secondary and tertiary sporidia, of smaller dimensions (v, 51). Terminal sporidia also appear of considerable length and more oval; but do not attain the size of the lateral sporidia. The various sizes (for instance, of the terminal sporidia) which, at the same time, are observed on the promycelium, indicate a successive origination of the sporidia (v, 53).

Later the sporidia fall from the promycelium, but remain connected together, that is, primary with secondary and even tertiary. Generally a large vacuole is seen in their interiors, near the basal end. After a few days the appearance of yeast cells, infusoria, etc., obstructs the observation. But even in clearer germinations, only a gradual disappearance of the contents in the sporidia and the promycelium, and a disorganization following it, is perceivable.

Only in one seeding I observed several cases of copulating sporidia. The copulation showed itself only on the fifth day after the seed, between pairs of isolated sporidia lying in water. Their length amounted to .004^{mm}, and their thickness to .002^{mm}; they appeared of a blunt oval form, with similarly fine grained contents, both of almost the same size. The union was effected by a narrow (.0015^{mm} long, .0005^{mm} thick) cylindrical crooked tube, which was in connexion with both sporidia lumina. These copulating sporidia showed no perceptible changes, and at last, after a few days, perished with the first seeding.[1]

Ust. antherarum germinates generally in from six and a half to eight hours. Spores which were taken from different species of supporting plants showed some differences in this process.

Ust. antherarum of Dianthus Carthusianorum germinates in the same manner as above.[2] The promycelium reaching a length of nearly the diameter of the spore, has a narrower base, oval point, and fine grained contents (vi, 1 *a*). In later growth it becomes larger in circumference (vi, 1 *b*, *c*), appears of the same thickness through the entire length, only at the bottom it is a very little narrower. Worthy of notice in this Ustilago, is the existence, on the side of the promycelium, of a pointed knob, at an almost equal distance from its ends (vi, 1 *c*). Commonly on the opposite side of the promycelium

[1] Compare my "Beitr. z. Kenntn. d. Ustil," Bot. Zeit., 1867, p. 394, sq.

[2] I omit here, and later, the description of the first germination appearances, in so far as they are similar to those of Ust. flosculorum.

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is an imperceptible indentation. The knob projects above the level of the promycelium, nearly .0005 to .0006^{mm}, and remains later unchanged. It is seen eighteen hours from the seed, on the promycelium, which has fallen off, or which is still connected with the spore. From the latter part of its contents passes over through the knob. Whether the knob merely represents a projection of the promycelium is difficult to decide, inasmuch as after the application of iodine, or a solution of chloride of zinc and iodine, the promycelium is divided by a cross wall at the place of indentation, the middle and both halves are held together by the knob (vi, 3 *c*). In this case it suggests a resemblance to a copulation which is effected by it. Promycelia with distinct knobs are .014^{mm} long, and from .002 to .0025^{mm} thick. In eighteen hours from the seed, promycelia of half the length are seen; in the large ones the contents are already separated into from two to four parts, with a clear shining oil drop in the centre of each of them. The partings correspond to indistinct indentations of the promycelium.

Promycelia of from .008 to .01^{mm} long separate sporidia (commonly two lateral and one terminal) .006^{mm} long and .005^{mm} thick. Promycelia and sporidia readily fall off; in from twenty-four to thirty hours most of them have sunk down in the water. At the same time there appear many sporidia in copulation by pairs (vi, 5, 6), or promycelium in copulation with a sporidium (vi, 7, 9). Here, also, the copulation is accomplished by a tube which, according to de Bary's precedent,[1] I will designate as a bridge. The latter proceeds from various places, but most frequently on the side of the promycelia and sporidia (vi, 7), in the latter, also, often from the point itself (vi, 5). The bridge is from .003 to .004^{mm} long, and .0015 to .002^{mm} thick, and is straight (vi, 6, 7), or curved (vi, 8), after several days sometimes bent in the form of "S." The connexion is firm, because the bridge does not get broken loose by rolling the sporidia with the needle, or by infusoria swimming past, etc. Iodine colors it yellow; weak sulphuric acid causes a little swelling in the middle part, also the appearance of fine granular contents. Neither iodine nor chloride of zinc and iodine causes a separation of sporidia in copulation (vi, 7 *a*). Their length amounts to from .008 to .01^{mm}, the thickness from .002 to 004^{mm}. After a few days vacuoles appear in them.

In the promycelia themselves there appear, during the formation of the sporidia, or shortly before, transverse indentations (vi, 2 *a*), and after forty hours (instead of the earlier small ones), as many large vacuoles as there are divisions (vi, 3 *b*).

[1] Morphol. u. Physiol. d. Pilze, p. 153 & 161.

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The cases where numerous and large sporidia are developed appear worthy of remark. In a seeding of June 11, in which, however, the water had dried up unperceived, no germination was shown until the 13th. On this day, fresh water was added, and on the 14th (therefore after nearly twenty-four hours) promycelia were seen of from .01^{mm} to .012^{mm} long, and .005^{mm} thick. Some of them produced terminal sporidia of from .005^{mm} to .006^{mm} long. Among them I found a case where, besides the promycelium with two lateral sporidia, there were two shorter promycelia on the opposite side of the spore, one of which produced lateral sporidia (vi, 12). On the 15th no perceptible changes occurred. On the 16th almost all the promycelia had produced sporidia at different places, and besides, out of the same spores from one to two new short promycelia grew. Where the formation of sporidia had taken place, several vacuoles and indentations showed themselves in the promycelium (vi, 13). On the 17th there were produced from the primary sporidia, still connected with the promycelium, secondary and tertiary sporidia, of from .01 to .014^{mm} long, and .006^{mm} thick (vi, 14 to 17). Short promycelia growing on the opposite side of the spore showed almost the same length as their sporidia, namely, .005^{mm}. In all these organizations vacuoles appeared. On June 22 (the eleventh day) there were first seen some sporidia (vi, 19) and promycelia (vi, 20 and 21) with threads, which I will designate as germinating threads. They were from .014^{mm} to .024^{mm} long, part straight, part crooked and winding (especially the longer ones). In this condition the promycelia were frequently connected with the spores. In the germinating threads appeared vacuoles (vi, 19 to 21). In the following days no further particular change showed itself, until June 26, when the entire seeding became very indiscernible on account of the too numerous yeast cells and infusoria.

In Ust. antherarum of Saponaria officinalis, a more abundant germination of the promycelium could be perceived. After twenty-four hours, many of them had produced germinating threads .02^{mm} and over in length, and .0015^{mm} thick, to which the greater part of the contents of the promycelium was transferred (vi, 22, 23). After three days, such promycelium was seen distinctly divided into two nearly equal cells —the germinating threads growing from the place of separation, or from the point of the promycelium, appeared .028^{mm} long and .002^{mm} thick. Some threads had a beak-shaped end (vi, 24). On the 5th day the promycelium was empty, but the germinating threads were filled with contents (vi, 25). There were also cases of dichotomous separation of the germinating threads, with a kidney shaped swelling at the

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point of one of the two branches, as it were in order to form a sporidium (vi, 26).

I did not discover in these Ustilagos, originating from the Saponaria, either a copulation or so frequent an appearance of the knob.

Ust. antherarum of Lychnis diurna germinated earlier—in from four to five hours. The other changes were almost the same as those already described in the first.

Ust. receptaculorum spores (of Tragopogon pratensis) under favourable circumstances germinate in from seven to eight hours. The promycelium increases rapidly in length and circumference. It is completely full of homogeneous, scarcely granular contents. Toward the point the promycelium becomes round and appears thicker than at the base. After twenty hours its length amounted to from .034^{mm} to .036^{mm}, with a thickness at the middle part and toward the point of .0006^{mm}, and at the base .005^{mm} (vi, 27). It appears straight, sometimes somewhat crooked and winding. At this time sporidia also are found, tubes, with a smaller base and fine granular contents (vi, 28 to 30). Their formation seldom follows earlier than thirteen or fourteen hours after the seed. They appear, at first, as oval projections, on the side or at the end of the promycelia whose contents partly pass over into them, and they increase principally in length. After twenty hours, sporidia of from .014 to .02^{mm} long, and from .003 to .004^{mm} thick are perceived. Their number generally amounts to from three to six, of which one or two are terminal. The lateral ones occur most commonly at that part of the promycelium, where cross divisions are to be seen. These divisions and vacuoles are seldom found until twenty hours from the seed. After forty-three hours the promycelia are often from .04^{mm} to .044^{mm} long, and from .006^{mm} to .007^{mm} thick, and at the same time have four distinct cross divisions, also just as many vacuoles (vi, 31, 32). In Ust. receptaculorum the formation of sporidia precedes also the cross divisions (vi, 28 to 30). However, by the application of reagents, it becomes apparent here also that a division has taken place, which also agrees with Tulasne's[1] investigations. After the cross divisions have distinctly appeared, the promycelium still goes on to produce sporidia, though their number is in no case considerable, in proportion to that of the spores germinated. A successive appearance of the sporidia is here, as also in other Ustilagos, not to be mistaken.

The dimensions of the sporidia are not uniform. Their length increases rapidly, and attains to from .02^{mm} to .024^{mm}, with a thickness of from

[1] 2d Mem. sur les Ured. p. 159.

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.004^{mm} to .0025^{mm}; in many seedings (after forty-eight hours), even .04^{mm} by from .005^{mm} to .0055^{mm} thick.

Their form also changes according to the degree of developement. At the beginning they are rather roundish, but they soon become much longer. The free end is the thickest (vi, 30); at the base, on the contrary, they become smaller as they grow further, until, as if supported on a little short stem, they fall with it from the promycelium. Becoming free, they grow further and their ends become rounder (vi, 34 to 36). Vacuoles appear in the contents, which at last fill the entire sporidium. Kidney formed sporidia, as represented by Tulasne,[1] did not occur in my experiments.

After eighteen or twenty hours, in many cases even earlier, sporidia are found, not only detached from the promycelium, but also still attached to it, in the process of copulation. The copulation bridge, similar to that earlier described, occurs at the time when the sporidia are still attached to the promycelium, which agrees with de Bary's observations as communicated to me by himself.[2] The points of connexion are very ununiform, and therefore also the starting place of the bridge. As an example, I mention two extreme cases, between which all others only represent transitions.

In the first the promycelium showed, on one and the same side, two longish, somewhat crooked and pointed sporidia, which, coming from different heights, almost touched the promycelium, but at the same time, came in contact, the upper end of the one with the base of the other (vi, 29). In the other case two, also lateral, sporidia (with rounded points), were observed, which, bending toward each other crosswise, came to lie with their middle parts one upon the other (vi, 30).

Between that terminal and this lateral connexion appeared various modifications. The most common are those where the bridge passes from the end of one sporidium into the middle part of the other (vi, 33 *d*); and those in which a lateral connexion between two takes place close to the ends (vi, 33 *b*). It is difficult in all cases to see the bridge at the first; later it becomes thicker and longer, whereby the connected sporidia likewise enlarge. Commonly it appears straight (vi, 33 *a*, *b*, *d*), often also bent (vi, 33 *c*). One of the connected sporidia is often still attached to the promycelium (vi, 32); they are almost always of different sizes, the difference may even

[1] l. c. Tab. xii, fig. 26.

[2] Compare Morphol. u. Physiol. der Pilze, p. 161, where this is mentioned as conjecture, in connexion with the observation, that the sporidia occasionally appear connected three together.

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be considerable (vi, 37). For instance, after forty-eight hours one of the connected sporidia was .04^{mm} long and .0055^{mm} thick, the other was only half the length and .004^{mm} thick.

After from thirty-eight to forty-three hours, or even somewhat earlier, in each of the connected sporidia, a cross wall appears. The two cells of almost equal size, arising thereby, remain connected together, and resemble the teleutospores of the Pucciniæ. In each of them there is a vacuole.

The sporidia also germinate in these Ustilagos. I observed in one very successful seeding, spiral tubes after forty-three hours. Each of them belonged to a pair of connected sporidia which could only be distinctly perceived by a short length of the tube or germ thread filled with semi-glossy, granular contents (vi. 34). In these sporidia also a cross wall was seen, but much less uniformly. Threads of from .04^{mm} to .05^{mm} long appeared also still in distinct connexion with the sporidia, but these had become so transparent and tender, that they might have escaped a less attentive observation (vi, 35 and 36). Some sporidia, with still longer germ threads, vanished almost completely during the observation. From a pair of sporidia, in whatever way connected, always only one generating thread originates. By a considerable lengthening, the part of the thread nearest the sporidium becomes transparent, the granular contents gather together toward the point (vi, 35 and 36); thus, for instance, in a thread of .136^{mm}, one part of it to an extent of .046^{mm} from the base, was empty, and at the same time cross walls had occurred. Later, the contents of the threads disappeared in places more and more; after six days, no trace of them could be discovered, although other sporidia and promycelia still remained distinctly visible.

Germination experiments, by withholding light, gave no anomalous appearances, excepting the germination occurring some hours later.

Ust. Carbo spores germinate easily and quickly, those from Avena sativa and Hordeum distichum in from four and a half to five hours (at 20° R., v, 7). The number of the germinated spores (of the supporting plants mentioned) only becomes considerable after seven or eight hours from the seed. Later, the promycelium often bends, and a little rounded projection arises on the outer curved side (v, 8 to 11). After eighteen hours, terminal sporidia are perceived on many promycelia, on others merely a tapering point, which afterwards swells up oval and separates as a sporidium. After forty-eight hours these promycelia mostly appear, as it were, bent in the shape of a knee, they are similar to the straight ones, and are from .014^{mm} to

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.026^{mm} long, and from .0025^{mm} to .003^{mm} thick; the granular contents have disappeared here and there. Sporidia are mostly found as three lateral and one terminal (v, 14 and 18). The lateral ones appear at first as a conical protuberance of the promycelium. Sometimes a second promycelium grows out of another place of the spore (v, 12, 13).

In the germination without water in contact with air, the short promycelium is divided commonly into two or three parts or branches of unequal length. The length of such promycelia amounts, for instance, to .01^{mm}, the thickness .0025^{mm}; while one of the branches is .054^{mm} long, the other .134^{mm}, with a thickness, when the granular contents can be seen, of .002^{mm}, and at those places which have become hyaline and are provided with cross walls .0015^{mm} thick. Besides from such spores grew one or two more promycelia near to the earlier one, or more frequently opposite; their granular contents disappeared in a short time and cross walls appeared in them.

The germination of the Ust. Carbo of Arrhenatherum elatius proceeds differently from the above. Its promycelia are much longer, more remarkably pointed, and seldom have the knee-formed bend (v, 24 to 28). Seventeen hours from the seed, most of them possess a length of .032^{mm}, and a thickness of .002^{mm}; also longish oval sporidia of the same thickness, and .005^{mm} long, which often contract at the base in a sterigma. After twenty hours the length of the promycelium amounts to from .04^{mm} to .066^{mm}; the longest appear, however, without sporidia, and transparent here and there.

The sporidia occur also later. After forty-eight hours the sterigmas appear much extended, and secondary sporidia may appear (v, 31 to 33); also promycelia, with one or two lengthened, curved, crooked branches, whose front ends come mostly in near connexion with the promycelium (v, 35 to 37), and become hyaline at the point (v, 39).

Some of the fallen off sporidia lengthen in a beak-form at one end. Occasionally after seventy-two hours this beak-formed end lengthens into a germ thread, of from .008^{mm} to .02^{mm} long.

Those promycelia coming in contact with the air lengthened directly into a long thread (v, 41); for instance promycelia of .036^{mm} long, and .0025^{mm} thick, developed a thread of .15^{mm} long and .001^{mm} thick.

Experiments by withholding the light caused here also a retarding of the germination for several hours, and especially a frequent occurrence of the promycelium bent in the knee shape. At the same time only few sporidia were produced, in some seedings none at all. A deviation from the spore formation worthy of mention is shown (v, 30).

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Ust. Carbo of Triticum vulgare developes mostly straight, or bow-formed, promycelia, the latter from .04^{mm} to .07^{mm} long. The disorganization of the promycelia followed earlier than in those mentioned above, often after four days.

Ust. Maydis germinates best in damp air, and in water with much more difficulty. In both cases many ungerminated spores remained back in the seeding. After twenty-two hours the promycelia are .01^{mm} long and .002^{mm} thick. They are straight (v, 4) or bent in the upper part (v, 5), and end with a thin point. Their contents are fine, granular, and glisten through. After forty-eight hours the length of the straight promycelia amounts to from .036^{mm} to .04^{mm}, their thickness at the base to .0015^{mm}, and at the point (which now is already thickened, and contains vacuoles) .003^{mm}. Crooked promycelia do not show any such considerable enlargement.

Ust. longissima germination is entirely different from the before mentioned. Fresh spores germinate in warm weather, in summer, in three hours. Before the germination, the spore swells perceptibly, its contents appear as a clear shining central drop. Soon after a very thin straight tube, the promycelium, comes through a small, scarcely perceptible opening of the episporium. It swells at the free end; this swelled part—or sporidium—increases in length, and separates visibly from the thinner part—the promycelium—which also becomes longer (v, 42 and 43). In an hour after the germination, the promycelium is .004^{mm} long, and from .0005^{mm} to .001^{mm} thick, the sporidium from .006^{mm} to .008^{mm} long and .0015^{mm} to .002^{mm} thick. Very soon the latter separates, whereby the promycelium, together with the spore, change their position somewhat. The promycelium shortens perceptibly soon after; in an hour a new sporidium is formed in the same manner. The separation of the sporidia follows thus successively, and only at the point of the promycelium; it continues also until the spore has emptied, commonly after about twenty-four hours. How great altogether the number of the sporidia are which separated from one promycelium, I could not exactly decide, notwithstanding the repeated use of Recklinghausen's moistening chamber.[1] The great number of fallen off sporidia in a twenty-four hour seeding, which surpass the number of the spores several times, shows, without doubt, that the separation is often repeated. The separating spores increase in length perceptibly, for after seventy-two hours they are mostly from .008^{mm} to .014^{mm} long; there are also a few vacuoles to be seen in them. Sporidia are also

[1] See Virchow's Archiv., Bd. 28, 1863, p. 162.

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found, though but seldom, .03^{mm} long, twenty-four hours from the seed. The fallen off sporidia sometimes separate secondary sporidia. No other changes occurred, worthy of mention, until the seeding perished.

In other seedings the germination occurred in from four to seven hours. Spores which have laid one or two months, germinate slower, sometimes in not less than eighteen hours.

If the promycelium in germinating comes in contact with the air (for instance, by the evaporation of the water), it divides in several branches of unequal length, and in that way resembles the sporidium of Tilletia Caries (v, 44 to 46).

That case where, after twenty-four hours, a lateral sporidium occurs at the base of the promycelium, cannot be considered otherwise than as abnormal.

De Bary investigated the germination of *Ust. Vaillantii* (from unpublished observations). To judge from the drawings, they are very similar to Ust. longissima.

Tilletia Caries belongs to the late and more difficult germinating species. Their germination only occurs after at least fifty hours and more, and that only by strewing the spores upon water, or in damp air (v, 1). At the length of .004^{mm} the promycelium is already .0025^{mm} thick. The course of the germination shows the same appearances as have been represented by Kühn (see the historical introduction), and requires here, therefore, no further description. I remark here that the length of the primary sporidia amounts to .08^{mm}. Those promycelia which occur in contact with water are only .24^{mm} long, and have protoplasmatic contents only in the upper half.

I succeeded only a few times in observing the germination of *Urocystis pompholygodes* (of various species of Ranunculus). The promycelium springs exclusively from the middle, darker coloured spores of the ball. If the germination ensues in a very little water, so that the forthcoming promycelium comes in contact with the air, in twenty-four hours they become .004^{mm} long and .002^{mm} thick, but send from their front end three or four fork-formed branches, or sporidia, similar to Tilletia Caries (vi, 38). All these formations are filled with fine granular contents. The form of the sporidia is longish oval, broader in the upper part than at the base. The point is mostly rounded, seldom long drawn out. The length of the sporidia amounts to from .01^{mm} to .014^{mm}, the thickness to from .003^{mm} to .0035^{mm}. After twenty-four hours the sporidia were .022^{mm} long and

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.004^{mm} thick (vi, 41). At the same time vacuoles, quite small or else two large ones, appear in each of them (vi, 42). No further changes took place before the disorganization.

If the germination takes place in water, a promycelium appears which forms no sporidia, it lengthens immediately (vi, 39), or divides, though seldom, in two branches, which likewise become long (vi, 40). After twenty-four hours the undivided promycelium, as well as the other, together with the branches, attains a length of from .14^{mm} to .16^{mm}, and a thickness of from .004^{mm} to .006^{mm}. The contents retrograde to the point; the rest appears hyaline and septate. Some branches still show a fork-like division at the point. After four days the tubes appear entirely transparent and shrunk, break up (vi, 43), and become indiscernible.

Notwithstanding many repeated attempts, I did not succeed in getting the following to germinate: *Tilletia endophylla*, *de Baryana*, *Ustilago Candollei*, *utriculosa*, *urceolorum*, *hypodytes* and *Sorisporium Saponariæ*. My experiments with these species were not only with fresh spores, but also with such as had been lying a few weeks and even from one to two years. The seeding was tried in and on water, as well as in damp air. In order to modify the germination, and suit the natural conditions more, the spores were sown on very thin transparent slices of elder pith, moistened in different degrees, but in all cases without any satisfactory results. I could not investigate the germination of the remaining Ustilagos for the want of fresh material.

6. Experiments on the Penetration of the Ustilagineæ in their Supporting Plants.

In order to demonstrate the penetration of the germinated spores in the supporting plants, I experimented with Ust. receptaculorum, flosculorum and Carbo.

The germinating seeds of Tragopogon pratensis were sufficiently sprinkled with water and spores of Ust. receptaculorum (Tragopogonis) sowed on different places of the embryo, and the seeding was kept under a glass globe in a moist condition. Some days thereafter promycelia and sporidia were visible, but only lying on the surface of the embryo. Neither penetration nor germination of the sporidia took place any where then or afterward. Spores placed upon the surface of the root and leaves, as well as of the stalk, and observing the same mode of proceeding as in the former experiments, germinated with more difficulty than in a drop of water on an object plate, and

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there was no penetration whatever of the germination products perceptible in the supporting tissue.

Sowing the spores of Ust. flosculorum on different parts of the growing Knautia arvensis gave the same negative results.

The most attention was given to sowing Ust. Carbo on oat and barley embryos. As in the former species experimented upon with reference to their germinating capacity, fresh spores originating on the oat and barley plants were placed upon the germinated seeds, and even on the entire surface of the rootlets, between them and the radicle, and, in more developed embryos, on the base point and entire surface of the leaves. The quantity of the spores was likewise not uniform. In this way infected embryos grew on earth, clean sand, or on the object plate. In each of these cases sufficient damp air was provided. Other embryos were sprinkled in the same manner with germinated spores. In other cases I sowed the seed with spores before their germination, so that in sprouting the rootlet not only came in contact with spores, but also met promycelia and sporidia. In all the above cases the result was the same—negative. Notwithstanding multitudinous germinations of the spores in the form of promycelia and sporidia, not a single case occurred of a penetration into any of the cells of the supporting plant. These experiments were repeated many times, but without successful results in any case. They are therefore in direct contradiction to Kühn's Tilletia investigations (which I was unable to repeat, therefore this case is not to be considered here). Further, they are in contradiction to Hoffmann's statements of Ust. Carbo, but he says himself that out of a hundred infection experiments, only very few were successful. In view of this statement, and as in my investigations all precautions were taken, by means of which the penetration of other parasites, such as Uredos and Peronospora, had been easily accomplished, it appears to me that these negative results surely indicate that for the penetration of the Ustilago germs, peculiar conditions are necessary which at present are not yet discovered. The nature of these conditions, and whether a di-morphism is perhaps connected with it, is to be discovered through further observations.

CONCLUSION.

All Ustilagineæ are exclusively endophytic fungi, inasmuch as their vegetation is accomplished only in the interior of the supporting plant. No matter whether the particular part inhabited by them grows above the ground or under it, or even under water.

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The formation of their fruit takes place always in certain organs of the supporting plant, and according to their species, either in the interior of the tissue or on the surface. All Ustilagineæ form spores, mostly in large massive beds, in which the spore formation is centripetal. With some exceptions, there is only one kind of spore known at present formed upon the supporting plants. *Sorisporium Saponariæ*, *Ustilago marina*[1] and *capsularum*[1] make these exceptions.

In germination all Ustilagineæ produce promycelia which form sporidia, though in many species the sporidia development proceeds more sparingly than in others. As the sporidia are to be considered as a particular species of spore, thus to all Ustilagineæ belong two kinds of spores, and to Sorisporium Saponariæ, Ustilago marina and capsularum probably three.

The penetration of the embryos of the Ustilagineæ into the supporting plant, and cases of di-morphism, etc., are to be demonstrated by further experiments. Two facts make it highly probable that the mycelium in some way enters at the base of the young plant, first, that in all positively ascertained cases of plants a year old, the mycelium passes through the entire attacked plant from its base to the place of spore formation; and, second, that in the numerous completely known parasitic fungi, the mycelium grows through the attacked plant from the place of its entrance to the place of the spore formation (Uredos, Peronospora).

The relation of the Ustilagineæ to the growth and developement of the supporting plant is diverse and often very strange. The promycelium injures the supporting plant the least. So it is met with in the cells which are still filled with chlorophyll (Ust. Carbo), or which contain a primordial utricle (Ust. Maydis). The developement of the pollen still takes place, so long as the mycelium only, or at the most only the first commencement of the spores are present, in the anthers.

On the contrary, the spore formation itself exerts a much more injurious influence. Ust. longissima and Sorisporium Saponariæ affect the growth of the supporting plant in this relation most unfavourably. Others hinder the growth of the supporting plants less than the formation of some of the organs, and therefore cause abnormal conditions. Thus Tilletia Caries destroys the ovulum, Ustilago Candollei and Maydis which also affects other parts of the maize, the entire ovary, as in part also does Ust. urceolorum. Ust. flosculorum and antherarum prevent the formation of the pollen, and therefore cause sterility of the

[1] *Tulasne*, Super. Fries. Taphr. g. Ann. d. sc. nat., iv ser., t. v, 1867, p. 133 to 136.

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blossoms. Ust. Carbo and destruens destroy the entire blossom. Sorisporium Saponariæ is also followed by sterility of the blossom. Ustilago hypodytes, Tilletia de Baryana and endophylla cause a backwardness in the developement of the main stem, together with the leaves, spikes, etc.

To conclude, the biological appearances of the Ustilagineæ show a great conformity with the known facts of other endophytes, and especially with those of the Uredos, with which latter the Ustilagineæ are generally associated in their system.

Moscow, *December*, 1867.

REVIEW OF THE SUPPORTING PLANTS AND THE USTILAGINEÆ OCCURRING ON THEM.

Cryptogams.

Fungi: Tuberacei.

Balsamina vulgaris, Vitt.—Ust. cyanea, Rabh. (doubtful species).

Monocotyledons.

Typhaceæ.

Typha minor, L.—Ust. typhoides, B. a. Br.

Gramineæ.

Lolium perenne, L. } —Ust. Carbo, Tul.; Till. Lolii, Awd.
" temulentum, L. }

Brachypodium ciliatum, P. B.—Ust. Carbo, Tul.
" pinnatum, P. B.—Till. endophylla, de By.

Agropyrum sp. (?)—Uroc. Agropyri m.=Uredo Agrop., Pers. (?)
" repens, P. B.—Ust. hypodytes, Fr.

Triticum monococcum, L. } —Till. Caries, Tul.
" sativum, Lam. }
" scabrum, R. Br.—Ust. Carbo, Tul.
" vulgare, Vill.—Till. Caries, Tul., Ust. Carbo, Tul., Uroc. occulta, Rabh. (in Australia), Ust. hypodytes, Fr. (? See Westend. et Wall. herb. crypt. belge, Nr. 1161).

Secale cereale, L.—Uroc. occulta, Rabh.; Ust. Secalis, Rabh.; Uroc. parallela (B. a. Br.) m.

Elymus arenarius, L.—Ust. hypodytes, Fr.

Hordeum distichum, L.—Ust. Carbo, Tul.
" murinum, L.—Ust. Carbo, Tul.; Till. Caries, Tul. (Durieu).
" vulgare, L.—Ust. Carbo, Tul.

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Bromus secalinus, L., and other species.—Ust. bromivora m. (=Ust. Carbo var. d. bromiv., Tul.), Till. Caries, Tul. (Philippar).
Festuca pratensis, Huds.—Ust. Carbo, Tul.
Dactylis glomerata, L.—Ust. Salveii, B. a. Br.
" sp.—Ust. longissima, var. megalospora, Riess.
Melica sp.—Ust. Carbo, Tul.
Poa pratensis, L.—Till. Caries, Tul. (Philippar).
" sp.—Ust. longissima, var. megalospora, Riess.
Glyceria aquatica, Prsl.—Ust. longissima, Lév.; Ust. grammica, B. a. Br.
" fluitans, R. Br.—Ust. longissima, Lév.; Ust. hypodytes, Fr. (Tulasne).
" spectabilis, M. K.—Ust. longissima, Lév.
Holcus mollis, L.—Tilletia de Baryana m.
Avena flavescens, L.
" pubescens, L. } —Ust. Carbo, Tul.
" sativa, L.
Arrhenatherum elatius, P. B.—Ust. Carbo, Tul.
Aira caespitosa, L.—Ust. Carbo, Tul.; Ust. grammica, B. a. Br.; Till. Caries, Tul. (Philippar).
Dactyloctenium ægyptiacum, Willd.—Ust. destruens, Dub.
Agrostis vulgaris, With. var. pumila, L. } —Till. sphaerococca (Rabh.) m.
Apera Spica-venti, P. B.
Phragmites communis, Trin.—Ust. typhoides, B. a. Br.; Ust. hypodytes, Fr.
Sorghum vulgare, Pers.—Till. Sorghi, Tul.
Andropogon hirtus, L.—Ust. Carbo, var. columellifera, Tul. (a. transfissa).
" Ischaemum, L.—Ust. Ischaemi, Fckl.
Cynodon Dactylon, L.—Ust. Carbo, Tul.
Digitaria sp.—Ust. Digitariæ, Rabh.
Pennisetum cenchroides, Rich. } —Ust. Carbo, var. γ columellifera,
Panicum colonum, L. } Tul. (b. tricophora).
" miliaceum, L.—Ust. destruens, Dub.
" repens, L.—Ust. hypodytes, Fr. (with spores of from .0032^{mm} to .0048^{mm} in diameter); Ust. destruens, Dub.
Setaria glauca, P. B.—Ust. destruens, Dub.
Lygeum sp.—Ust. hypodytes, Fr. (=Ust. Lygei, Rabh.)
Zea Mays, L.—Ust. Maydis, Lév.; Ust. Schweinitzii, Tul.
South African grasses.—Ust. Dregeana, Tul.

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Cyperaceæ.

Carex acuta, L.—Uroc. Agropyri m. (=Uredo Agrop., Pers).
" brizoides, L.
" capillaris, L.
" clandestina, Good.
" digitata, L.
" ericetorum, Poll.
" ferruginea, Scop.
" firma, Host.
" flava, L.
" glauca, Scop.
" limosa, L.
} —Ust. urceolorum, Tul.
" Linkii, Willd.—Thecaphora aterrima, Tul. (doubtful species).
" Michelii, Host.
" montana, L.
" ornithopoda, Willd.
" panicea, L.
" paniculata, L.
" pilosa, Scop.
" pilulifera, L.
} —Ust. urceolorum, Tul.
" praecox, L.—Ust. urceolorum, Tul.; Thecaphora aterrima, Tul. (doubtful species).
" Pseudo-Cyperus, L.
" publicaris, L.
} —Ust. urceolorum, Tul.
" riparia Curt.—Ust. olivacea, Tul.
" rupestris, All.
" Schreberi, Schrk.
" stellulata, Good.
" supina, Whlbg.
" sylvatica, Huds.
} —Ust. urceolorum, Tul.
" sp.—Uroc. parallela (B. a. Br.) m.
Elyna spicata, Schrd.—Ust. urceolorum, Tul.
Scleria sp.—Ust. (?) Scleriæ, Tul. (doubtful species).
Scirpus parvulus, R. Sch.—Ust. marina, Dur.
Rhynchospora alba, Vahl.—Ust. Montagnei, Tul.; Ust. Montagnei, var. major, Desm.
Schœnus sp.—Ust. Montagnei, Tul.

Juncaceæ.

Juncus sp.—Ust. pilulæformis, Tul. (south Africa; doubtful species).

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Colchicaceæ.

Colchicum autumnale, L.—Uroc. Colchici, Rabh.

Liliaceæ.

Muscari comosum, Mill.
Scilla anthericoides, Poir.
" bifolia, L.
" maritima, L.
} —Ust. Vaillantii, Tul.
" sp.—Uroc. Colchici, Rabh.
Gagea lutea, Schult.—Ust. antherarum, Fr. (?)

Palmæ.

Phœnix dactylifera, L.—Ust. Phœnicis, Cord.

Dicotyledons.

Artocarpeæ.

Ficus Carica, L.—Ust. Ficuum, Rchdt.

Utricaceæ.

Urtica dioica, L.—Thecaphora (?) aurantiaca, Fingh. (doubtful species).

Polygoneæ.

Rumex Acetosella, L.—Ust. utriculosa, Tul.
Oxyria reniformis, Hook.—Ust. vinosa, Tul.
Polygonum alpinum, All.
" Bistorta, L.
} —Ust. Candollei, Tul.
" Hydropiper, L.—Ust. Candollei, Tul.; Ust. utriculosa, Tul.
" lapathifolium, L.
" minus, Huds.
" Persicaria, L.
} —Ust. utriculosa, Tul.
" viviparum, L.—Ust. Candollei, Tul.
" sp, (south Asiatic species)—Ust. Candollei, var. a. Berkeleyana, Tul.

Dipsaceæ.

Knautia arvensis, Coult.—Ust. flosculorum, Fr.

Compositæ.

Carduus acanthoides, L.—Ust. Cardui m.
Tragopogon porrifolius, L.
" pratensis, L.
Scorzonera humilis, L.
} —Ust. receptaculorum, Fr.

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Convolvulaceæ.

Convolvulus arvensis, L.
Calystegia sepium, R. Br.
" Soldanella, R. Br.
} —Ust. capsularum, Fr.

Scrophularineæ.

Linaria spuria, Mill.—Ust. hypogaea, Tul.

Veronica praecox, All.—Thecaphora Delastrina, Tul. (doubtful species).

Euphrasia lutea, L.—Thecaphora aterrima, Tul. (= Sorisporium schizocaulon Euphrasiæ, Ces.; doubtful species).

Rosaceæ.

Fragaria collina, Erhr.—Thecaphora (?) aurantiaca, Fingh. (doubtful species).

Papilionaceæ.

Medicago tribuloides, Lam.—Thecaphora deformans, Dur. et Montgn. (doubtful species).

Ampelideæ.

Cissus sicyoides, L.—Ust. (?) Cissi, Tul. (doubtful species).

Alsineæ.

Stellaria graminea, L.—Ust. antherarum, Fr. (Sowerby).

Cerastium glomeratum, Thuill.—Ust. Druiaeana, Tul.

Sileneæ.

Gypsophila sp.—Sorisporium Saponariæ, Rud.

Dianthus Carthusianorum, L.—Ust. antherarum, Fr.; Sorisp. Saponariæ, Rud.

" Seguierii, Vill.—Sorisp. Saponariæ, Rud.

Saponaria officinalis, L.—Ust. antherarum, Fr.; Sorisp. Saponariæ, Rud.

Silene inflata, Sm.—Ust. antherarum, Fr.; Sorisp. Saponariæ, Rud.

" nutans, L.
" Otites, Sm.
" rupestris, L.
} —Ust. antherarum, Fr.

" velutina, Pourr.
} —Sorisporium Saponariæ, Rud.

Lychnis dioica, L.
" diurna, Sibth.
" Flos cuculi, L.
" vespertina, Sibth.
} —Ust. antherarum, Fr.

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Violaceæ.

Viola odorata, L.—Uroc. Violæ (B. a. Br.) m. (=Sorosp. schizocaulon Violæ, Ces.)

Ranunculaceæ.

Anemone sp.
Ranunculus bulbosus, L.
" repens, L., and others.
Ficaria ranunculoides, Roth.
Helleborus viridis, L., var. atro-virens and others.
—Uroc. pompholygodes, Rabh.

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EXPLANATION OF THE PLATES.

PLATE I—MYCELIUM.

FIG. 1—TILLETIA ENDOPHYLLA D B Y (900-1).

Fig. 1. Long, extended threads, with vacuoles extending through several cells. Cut lengthwise through a young leaf.

FIG. 2-4—TILLETIA DE BARYANA M. (900-1.)

Fig. 2. Isolated, exposed threads, with large vacuoles, from the parenchyma cells of the base of the leaf. Cut lengthwise.

Fig. 3. Threads with the commencement of the ramification and a few vacuoles. A young leaf sheath which has sprouted from the rhizoma cut lengthwise.

Fig. 4. Threads penetrating through the cells. Cut across one of the nodes.

FIG. 5-8—USTILAGO MAYDIS LEV.

Fig. 5. Long, extended threads beginning to ramify, running through a pith cell (in which a nucleus is still to be seen). From the second internode below a blighted rhachis (500-1).

Fig. 6. A long, extended thread, covered with a cellulose sheath and passing through many cells. At *a* the thread shines through; at *b* is plainly seen the lumen of the cut sheath and of the thread. Cut lengthwise through the rhachis at the bottom of the ovary (250-1).

Fig. 6*a*. The previous figure at *a*, a conspicuous piece of thread enlarged 900 times; in the thread is seen the contents, the cellulose sheath is strongly marked.

Fig. 7. Threads which have become distinctly visible in the cellulose sheath by the application of potash and iodine. Shown detached from a cell of the ovary wall (500-1).

Fig. 8. Thin walled thread (like the transition form in the sporeforming threads), with many shoots and fine grained contents. Parenchyma of ovary wall cut lengthwise (500-1).

PLATE II—MYCELIUM.

FIG. 1-4—USTILAGO CARBO TUL. OF OATS.

Fig. 1. A thread contained in cellulose of shining appearance in the node cells. Cut lengthwise (500-1).

Fig. 2. Mycelium running partly in and between the cells, with the commencement of branches within the cells. A node from the upper half of the stem cut lengthwise (900-1).

Fig. 3. Mycelium, with a sucker in the upper part. The stem of a very young hothouse root cut lengthwise (500-1).

Fig. 4. A piece of a thread passing through two cell walls; cut lengthwise in the node of the above hot-house root (500-1).

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FIG. 5 AND 6—USTILAGO CARBO TUL. OF ARRHENATHERUM ELATIUS.

Fig. 5. Mycelium from the uppermost node. Cut lengthwise (900-1).

Fig. 6. Branched threads in the cells of the base of the glumes; transition form in the spore-forming threads. From a young blossom still unrolled (500-1).

FIG. 7—USTILAGO HYPODYTES FR., FROM ELYMUS ARENARIUS.

Fig. 7. Threads with cross walls and watery contents. The main stem cut lengthwise (900-1).

FIG. 8—USTILAGO LONGISSIMA LEV., FROM GLYCERIA FLUITANS.

Fig. 8. Threads filled with a watery fluid, running in the cells and through the cell walls. Prarenchyma of the leaf cut lengthwise (900-1).

FIG. 9—USTILAGO ANTHERARUM FR., FROM SAPONARIA OFFICINALIS.

Fig. 9. Threads running in the anther walls (900-1).

FIG. 10–12—SORISPORIUM SAPONARIÆ RUD.

Fig. 10. A crooked thread furnished with a sucker, penetrating through the cell walls. Node cut lengthwise near the rhizoma (500-1).

Fig. 11. A straight thread having partly plastic and partly watery contents and vacuoles. Cut lengthwise through the under part of the ovary (900-1).

Fig. 12. The upper part of the thread in a cellulose sheath, the remainder ramifying. The main stem cut lengthwise (500-1).

PLATE III—SPORE-FORMING THREADS AND SPORE FORMATION.

NOTE.—The dark, shaded lumps and stripes in the interior of the spores and threads represent the glossy contents.

FIG. 1–5—TILLETIA CARIES TUL., FROM WHEAT.

Fig. 1. Spore-forming threads with the commencement of branches, on the end of which occur the spores. From an ovary of 1 cent. long (900-1).

Fig. 2. A young spore still in connexion with the thread (900-1).

Fig. 3. Young spores in various stages of developement, mostly on the branches of the principal thread. The spores contain oil drops, the smallest a vacuole (500-1).

Fig. 4. Separation of the thread into two branches, on the end of each of which are spores of different degrees of ripeness (500-1).

Fig. 5. Clear transparent, single contoured spore, with the remains of the spore-forming thread. In the contents, oil drops (500-1).

FIGS. 6–13. TILLETIA ENDOPHYLLA, D BY.

All conditions of the young leaves of the Brachypodium pinnatum. (Figs. 6 to 10, 500-1; the remainder, 900-1.)

Fig. 6. Swelling of the oil-containing threads preliminary to spore formation.

Fig. 7. Commencement of spores of a longish form, and with an oil drop. In figs 7 to 9, *a* denotes the boundary of the cell wall from which the thread projects.

Figs. 8, 9. Later conditions; the spore is rounder, but has not yet attained the limits of the thread attached to it. In the contents an oil drop.

Fig. 10. A developed spore which has come to full size.

Fig. 11. Developed spores, with beak-shaped lengthening, and partly still in connexion with the spore-forming thread. In the spores, oil drops and vacuoles. Cut lengthwise.

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Fig. 12. The endosporium is distinctly to be seen in the beak-formed continuation; except at this place, the episporium covers the entire periphery.

Fig. 13. An incompletely formed transparent spore, whose contents appear like a large oil drop.

FIG. 14–16. TILLETIA DE BARYANA M. (900-1).

Fig. 14. Spores distinctly occurring on the branches, one of them still connected, the other, its limits attained, has become rounder.

Fig. 15. The gelatinous layer of the upper end of the thread still surrounding the spore.

Fig. 16. Completed condition; the spore still surrounded with the gelatinous layer.

FIG. 17–24. USTILAGO MAYDIS, LEV.

Fig. 17. Form of the threads as they sometimes occur in the cells of the ovary, in which there are already ripe spores; their use is still unknown (900-1).

Fig. 18. Thread become gelatinous; the contents are indistinctly seen. From a gelatinous spore mass (900-1).

Fig. 19. Spore-forming threads, with bright oleaginous contents, running between the cells. Ovary cut lengthwise (500-1).

Fig. 20. Gelatinous thread with a distinct breaking up of the contents for spore formation; the upper part represents the same conditions as fig. 19. Its course between the cells was still, in part, distinctly perceivable (900-1).

Fig. 21. More transparent spores forming in the interior of the gelatinous thread (900-1).

Fig. 22. The same; however a great number of the transparent spores are seen lying in a row, lengthwise in the stem. The latter appears more transparent (900-1).

Fig. 23. A spore become brownish, surrounded by the gelatinous membrane of the thread. From the ovary wall (900-1).

Fig. 24. An affected ovary cut lengthwise; the single mass of ripe spores appear as black spots or stripes arranged between the vessels (natural size).

FIG. 25, 26. USTILAGO HYPODYTES, FR., FROM ELYMUS ARENARIUS (900-1).

Fig. 25. Gelatinous threads, in which spores are already formed; isolated from a gelatinous spore mass.

Fig. 26. Stem cut crosswise, on the surface a bed of ripe spores; in the cells mycelium, which enters the exterior layer of cells.

FIG. 27–29. USTILAGO LONGISSIMA, LEV., FROM GLYC. FLUITANS (900-1).

Fig. 27. Gelatinous thread, in which spores have already developed. From a spore mass.

Fig. 28. Part of the edge of a young spore mass; the gelatinous thread breaking up into spores of glossy gelatinous appearance.

Fig. 29. Young transparent spores with glossy oleaginous contents.

FIG. 30–35. USTILAGO ANTHERARUM, FR., FROM DIANTHUS CARTHUSIANORUM.

Fig. 30. Gelatinous threads, with swellings at the beginning of the spore formation; *a* the border of the epidermis cell. An isolated anther wall cut lengthwise (500-1).

Fig. 31. Isolated gelatinous thread with distinctly breaking up glossy contents, whose lumen at the under end is still filled up as earlier (900-1)

Fig. 32. Gelatinous thread, of which the greater part has already distinctly broken up into spores; at its end riper conditions (500-1).

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Fig. 33. A number of gelatinous threads run into one another, in which spore formation is distinctly going on. The round, mostly contoured contents shine distinctly through. From an anther (900-1).

Fig. 34. Distinct breaking up of the thread into spores; at *a* the contents have divided into three parts for spore formation; *b*, remains of the thread (900-1).

Fig. 35. In the upper part of the thread a coloured spore, in the lower part the commencement of a spore (900-1).

FIG. 36. USTILAGO ANTHERARUM FR., FROM LYCHNIS DIURNA (900-1).

Fig. 36. Piece of a gelatinous thread with very irregular ramifications, and spores in different stages of development. From a young anther.

FIG. 37. USTILAGO ANTHERARUM FR., FROM SAPONARIA OFFICINALIS (900-1).

Fig. 37. Distinct contraction of the gelatinous thread and with the contents breaking up.

FIG. 38. USTILAGO UTRICULOSA TUL., FROM POLYGONUM PERSICARIA (900-1).

Fig. 38. Fork formed separation of the gelatinous thread, and therefore of the contents which pass in to the branches.

FIG. 39–42. USTILAGO FLOSCULORUM FR. (900-1).

Fig. 39. In the upper part the distinct remains of a gelatinous thread; further down the spores begin to develope.

Fig. 40. Gelatinous thread, in whose branches spores also develope.

Fig. 41. Gelatinous thread with still very young commencement of spores and with ramifications.

Fig. 42. Gelatinous mass of threads running in and out of one another, with contents breaking up and completed spores. From a part of the edge of a young spore mass.

FIG. 43–46. USTILAGO RECEPTACULORUM FR., FROM TRAGOPOGON PRATENSIS.

(*Fig.* 45. From an unpublished drawing of de Bary 500-1.)

Fig. 43. A thread already become slightly gelatinous with distinct ramifications. From a young spore mass.

Fig. 44. The upper part of a thread with a strong gelatinous membrane, and with a contents mass.

Fig. 45. Later conditions, in the branch the spore membrane appears distinct, the gelatinous membrane becomes thinner; only in the thread itself is seen the first breaking up of the contents.

Fig. 46. Young, but considerably developed spores, still surrounded by the gelatinous membrane of the thread.

PLATE IV—SPORE-FORMING THREADS AND SPORE FORMATION.

FIG. 1–6. USTILAGO URCEOLORUM TUL., FROM CAREX PILULIFERA.

Fig. 1–4, 900-1; *Fig.* 5–6, 500-1.

Fig. 1. Gelatinous threads, whose contents in the narrow lumen only glimmer through in a few of them. From a tress of threads from the interior of the ovary and somewhat spread apart with a needle.

Fig. 2. Separated thread with the contents distinctly passing over in the side branch

Fig. 3. Separated piece of thread, the contents breaking up into shining stripes.

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Fig. 4. The same, but with a broader lumen; the contents are only visible in places

Fig. 5. Spore formation out of threads run into one another, whose contour is still perceivable; the spores themselves are in different degrees of developement. Separated from a young spore mass.

Fig. 6. Unripe spores, still surrounded with the gelatinous membrane; the contour of the threads from which they came indiscernable.

FIG. 7–23. SORISPORIUM SAPONARIÆ RUD.

(Figs. 13, 14 and 16 to 23 from unpublished drawings of de Bary's.)

Fig. 7. Mycelium threads boring through the cell walls and immediately changing to spore-forming threads (900-1).

Fig. 8. A gelatinous thread, with a very narrow lumen in one of its branches, coming from the anther tissue (500-1).

Fig. 9. The same but with the branches bending together (900-1).

Fig. 10. The same, the end curving in for the formation of the ball (500-1).

Fig. 11. Separated gelatinous thread with numerous ramifications (900-1).

Fig. 12. Young spore ball with the beginnings of four spores, visible in a plane, surrounded by gelatinous threads run into one another, with small parts of the contents glimmering through. The young spores have been separated by the application of a strong solution of iodine (500-1).

Fig. 13. Young spore balls with a few spore beginnings (200-1).

Fig. 14. The same, but with a greater number of spore beginnings (200-1).

Fig. 15. Developed spores, surrounded with a thinned layer of the gelatinous thread (900-1).

Fig. 16. The same, at the same time two separated spores are seen in connexion with the ball (300-1).

Figs. 17 to 19. Separated spores in different degrees of developement (300-1).

Fig. 20. Part of the anther filament cut lengthwise, with distinct centripetal spore formation (70-1).

Fig. 21. Various ripe spore balls; the gelatinous layer has almost disappeared from the ripest (200-1).

Fig. 22. Almost ripe, somewhat long spore ball, from which the gelatinous layer has disappeared (200-1).

Fig. 23. Blossom stalk of the Saponaria officinalis, with ripe spores in the three large, closed blossoms, in the others, spores of different degrees of ripeness (natural size).

PLATE V.[1]—GERMINATION OF THE SPORES.

FIG. 1, 2. TILLETIA CARIES, TUL., FROM WHEAT.

Fig. 1. Promycelium at the commencement of the germination; fifty hours from the seed (500-1).

Fig. 2. Separation of the promycelium; fifty-two hours[2] (450-1).

FIG. 3–6. USTILAGO MAYDIS, LÉV. (500-1).

Fig. 3. Promycelium with a projection; twenty-four hours.

Fig. 4. Spore germinated later with a straight promycelium; forty-eight hours.

Fig. 5. The same with the promycelium bent in a knee form.

Fig. 6. Formation of a lateral sporidium (after twenty-four hours).

[1] In plates v and vi, the thickness of the episporium is not shown.

[2] Indicates in all cases from the seed.

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Fig. 7–15. Ustilago Carbo, Tul., from oats.

Fig. 7. Germinating spore; four hours (500-1)

Fig. 8. Promycelium with a projection on the side; eighteen hours (900-1).

Fig. 9. The same, with a bending of the promycelium immediately upon its coming from the spore (900-1).

Figs. 10 and 11. Other forms of bent promycelia; eight hours (900-1).

Fig. 12. The promycelium divided in two at the point, on the side a sporidium is developed, and another promycelium coming from the spore; forty-eight hours (900-1).

Fig. 13. Two promycelia, the longest with two sporidia; forty-eight hours (900-1).

Fig. 14. Promycelium with three lateral sporidia and one terminal; forty-eight hours (900-1).

Fig. 15. Thread formed lengthening of the promycelium; a spore germinated partly in contact with air (500-1).

Fig. 16–20. Ustilago Carbo, Tul., from barley.

Fig. 16. Crooked promycelium with two lateral sporidia, and the beginning of a third; forty-eight hours (900-1).

Fig. 17. Promycelium with a crooked sporidium; forty-eight hours (900-1).

Fig. 18. Promycelium with three lateral sporidia, one of which is on the projection.

Fig. 19. Promycelium with a terminal sporidium, and coupled with one that has fallen off; fifth day (900-1).

Fig. 20. Crooked promycelium with a lateral sporidium bending inwards, and the beginnings of two others; fifth day (900-1).

Fig. 21–41. Ustilago Carbo, Tul. from Arrhenatherum elatius.

(Fig. 21–40, 900-1; fig. 41, 500-1.)

Fig. 21. Germination, twenty-four hours, with sufficient water.

Fig. 22. The same, with an insufficient amount of water.

Fig. 23. The same; from the thin promycelium proceeds a thread-like utricle.

Fig. 24. The same; with two lateral sporidia bending toward each other.

Fig. 25. The same; with a longer promycelium, and with a projection and lateral sporidium.

Fig. 26. Developement of a secondary sporidium; thirty hours.

Fig. 27. Promycelium with a lateral and terminal sporidium; thirty hours.

Fig. 28. Promycelium with a terminal and two lateral sporidia and thinned end; thirty hours.

Fig. 29. Unusual form of a forked promycelium; thirty hours.

Fig. 30. Peculiar formation of the sporidia, which seldom happens; thirty hours, in darkness.

Fig. 31 Promycelium with secondary sporidium formation; forty-eight hours.

Fig. 32. Considerable lengthening of the lateral sporidia; forty-eight hours.

Fig. 33. Secondary sporidium formation from a considerably lengthened lateral sporidium; forty-eight hours.

Fig. 34. From the spore comes a second promycelium with a terminal sporidium; forty-eight hours.

Fig. 35. Promycelium, with a long, serpentine, lateral sporidium, which comes in contact with the projections; forty-two hours.

Fig. 36. Bow-shaped, lateral sporidium, whose end has grown to the promycelium; forty-two hours.

Fig. 37. Promycelium, with two such sporidia; forty-two hours.

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Fig. 38. Serpentine sporidium vertical to the promycelium, with a secondary sporidium on the point; forty-two hours.

Fig. 39. Another form of a bow-shaped sporidium; fourth day.

Fig. 40. Spore with three promycelia, on two of them spore formation; fifth day.

Fig. 41. Spore germinated in contact with air; seventy-two hours.

FIG. 42–46. USTILAGO LONGISSIMA LEV., FROM GLYCERIA FLUITANS.

Fig. 42. Promycelium with a developed sporidium; eight hours (300-1).

Fig. 43. Promycelium, with a spindle-shaped sporidium; twenty-four hours (400-1).

Fig. 44, *a*, *b*, *c*. Various forms of lateral sporidia which, in connection with the promycelium originated in air; forty-eight hours (300-1).

Fig. 45, *a*. A second promycelium grows from the spore; *b*, sporidium, with a secondary on the point. Both cases, in connection with the promycelium, originated in air; forty-eight hours (300-1.)

Fig. 46. Sporidium formation, resembling the sporidia of Tilletia, from the previous seeding (300-1).

FIG. 47–53. USTILAGO FLOSCULORUM FR.

Fig. 48, 450-1; the remainder 900-1.

Fig. 47. Germination; six hours.

Fig. 48. Different stages, twenty hours; *a*, promycelium without sporidium; *b*, promycelium with a terminal and two lateral sporidia; *c*, promycelium, with a terminal and three lateral sporidia.

Fig. 49. Different stages, second day; *a*, promycelium divided into four distinct parts, with four small vacuoles and a terminal sporidium; *b*, the same, with four distinctly marked divisions and large vacuoles.

Fig. 50. Promycelium with secondary sporidium formation; twenty-four hours.

Fig. 51. Promycelium with secondary and tertiary sporidia formation; thirty-nine hours.

Fig. 52. Promycelium with numerous sporidia; third day.

Fig. 53. Promycelium with numerous secondary sporidia; thirty-nine hours.

PLATE VI—GERMINATION OF THE SPORES.

FIG. 1–21. USTILAGO ANTHERARUM, FR., FROM DIANTHUS CARTHUSIANORUM.

Fig. 2–21, 900-1.

Fig. 1. Germination; *a*, seven hours (500-1); *b*, promycelium with bright little oil drops; eighteen hours (300-1); *c*, somewhat later conditions with a distinct lateral knob (500-1).

Fig. 2. Different conditions: *a*, promycelium with a contraction and lateral sporidium; *b*, promycelium with a contraction and two lateral sporidia; *c*, promycelium with four vacuoles and two sporidia.

Fig. 3. Separated promycelia; forty hours. All show a distinct knob; *a*, with four small vacuoles; *b*, with two large and two small vacuoles; *c*, after the application of a solution of chloride of zinc and iodine, the promycelium is broken up, except at the place of the knob.

Fig. 4. Promycelium fallen off with an unusually well-developed knob; seldom the case; forty hours.

Fig. 5. Two sporidia in terminal copulation; forty hours.

Fig. 6. Two sporidia in lateral copulation; forty hours.

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Fig. 7. Promycelium in lateral copulation with a sporidium; forty hours.

Fig. 8. Lateral copulation of the promycelium with the point of the sporidium; third day.

Fig. 9. The same, but the copulation of the sporidia is lateral, the promycelium still in connection with the spore.

Fig. 10. A promycelium which has fallen off, with a germ thread.

Fig. 11. Two copulating sporidia with a long, crooked bridge; one of them clear as water.

Fig. 12. Besides a promycelium with three sporidia, two others come out of the spore (one of them with a sporidium); second day.

Fig. 13. The same with some modifications; fourth day.

Fig. 14. The same with secondary formations; fifth day.

Fig. 15. The same; another modification; fifth day.

Fig. 16. Two promycelium grown from the spore on opposite sides, with tertiary spore formation; fifth day.

Fig. 17. Luxuriant sporidium formation on a promycelium which has fallen off; fifth day.

Fig. 18. Promycelium in copulation with a sporidum out of which a secondary sporidium has developed itself; sixth day.

Fig. 19. Germinating sporidium still in connexion with the promycelium; eleventh day.

Fig. 20. Germination of the promycelium; eleventh day.

Fig. 21. The same, but with two other promycelia grown out of the spore.

Fig. 22–26. Ustilago antherarum, Fr., from Saponaria officinalis (900-1).

Fig. 22. Germinated promycelium; its upper part hyaline; twenty-four hours.

Fig. 23. Germination of the promycelium at the point, at the opposite end a sporidium. Vacuoles in the contents.

Fig. 24. Another form of lateral germ-thread, with a swelling at the point. In the lower part of the promycelium, watery contents; forty-eight hours.

Fig. 25. The plastic contents of the promycelium have passed over into the side tube; fifth day.

Fig. 26. Dichotomous division of the promycelium; at the end of the longer branch apparently a sporidium. The promycelium partly hyaline; fifth day.

Fig. 27–37. Ustilago receptaculorum, Fr., from Tragopogon pratensis.
(Fig. 27–30, 450-1; fig. 31–36, 900-1; fig. 37, 500-1.)

Fig. 27. Promycelium; twenty hours.

Fig. 28. Promycelium with two lateral sporidia; second day.

Fig. 29. Promycelium with three lateral sporidia, two of them in copulation at their ends; second day.

Fig. 30 The same, but the sporidia lie cross-wise over one another in lateral copulation.

Fig. 31. Promycelium divided in four parts, and hyaline; fourth day.

Fig. 32. The same, but with three lateral sporidia, the under one of which is in copulation with a sporidium which has fallen off.

Fig. 33. Different conditions of copulating sporidia; fourth day; *a*, side copulation; *b*, side copulation, but nearer to the point; *c*, side copulation, with a long, crooked bridge; *d*, side-terminal copulation.

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Fig. 34. Two hyaline sporidia in lateral copulation, one of which has germinated; fourth day.

Fig. 35. The same, the sporidia, however, are in terminal copulation; the germ-thread is longer, and hyaline at the bottom.

Fig. 36. The same; the germ-thread very long, partly hyaline, and with cross walls.

Fig. 37. Two sporidia in lateral copulation, of considerable and unequal length; fourth day.

Fig. 38–43. Urocystis pompholygodes, Rabh. from Ranunculus repens (500-1).

Fig. 38. Promycelium with four sporidia; twenty-four hours.

Fig. 39. Out of one spore has grown a promycelium with three sporidia; out of the other, two long tubes, through contact of the germ with water; twenty-four hours.

Fig. 40. Promycelium dichotomously divided into long branches, which are partly hyaline and partly septate, occurring through contact with water during the germination; twenty-four hours.

Fig. 41. Promycelium with three distinct sporidia; twenty-eight hours.

Fig. 42. The sporidia are close together, and contain vacuoles; the promycelium invisible; twenty-eight hours.

Fig. 43. From standing long in water, instead of there being promycelia, tubes have appeared, which are scarcely to be seen; the under one is already breaking up, and is disorganized; fourth day.

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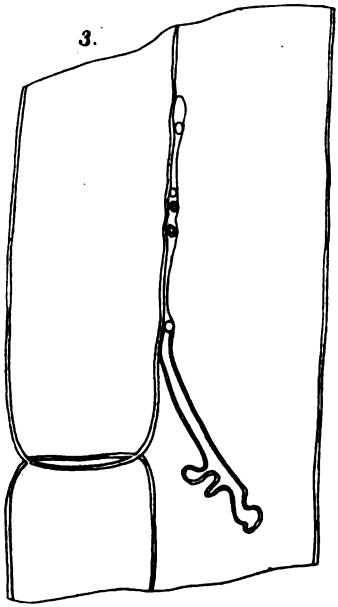

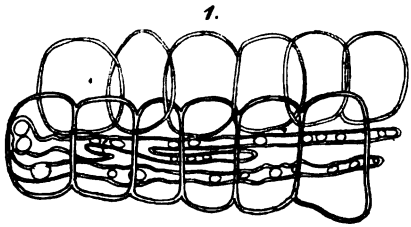

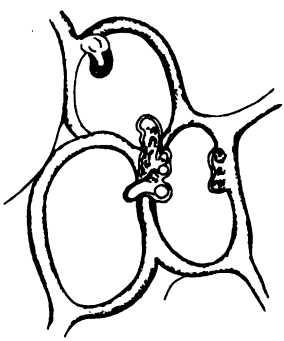

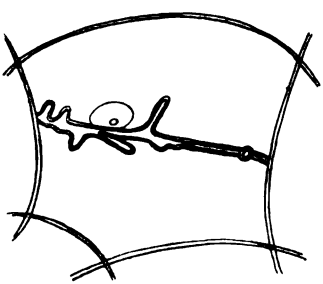

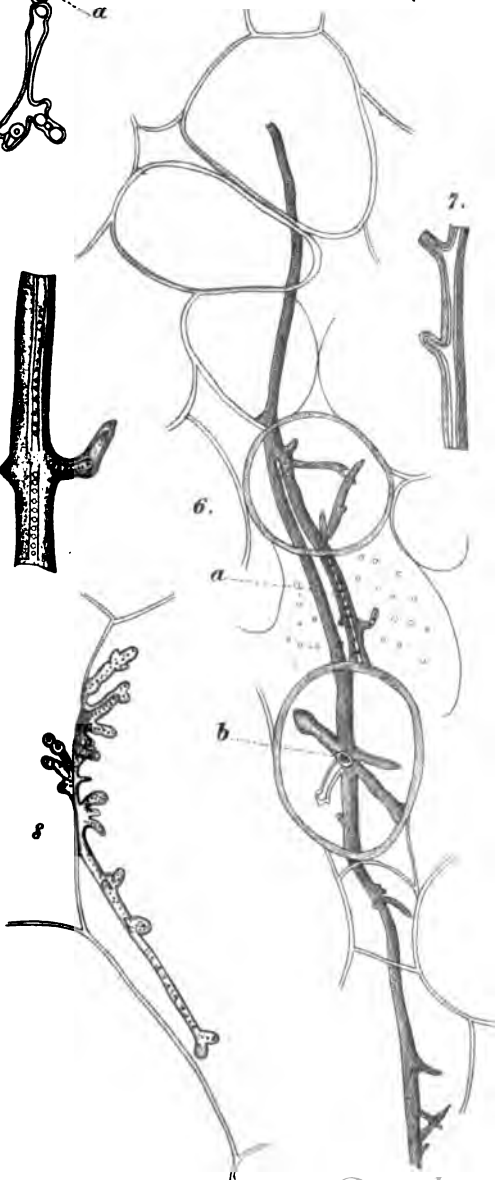

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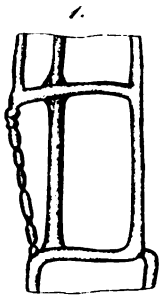

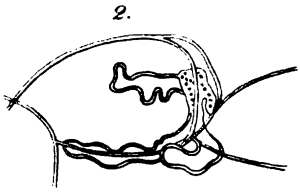

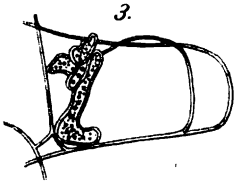

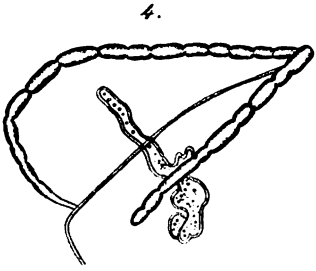

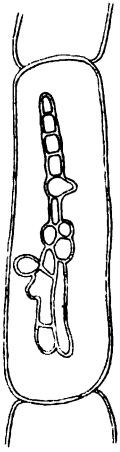

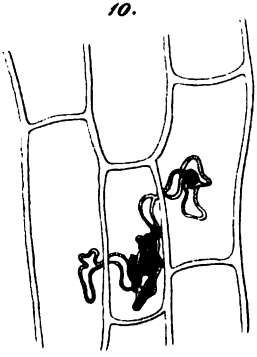

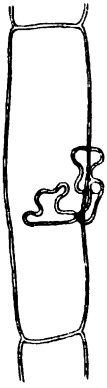

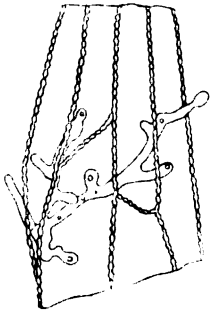

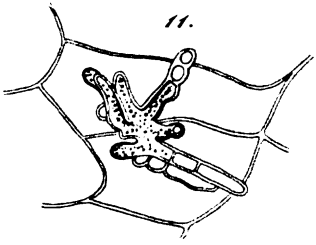

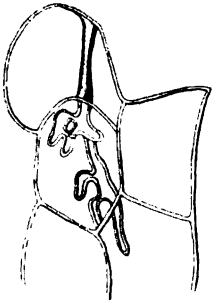

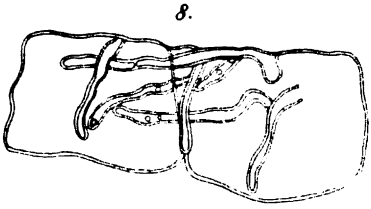

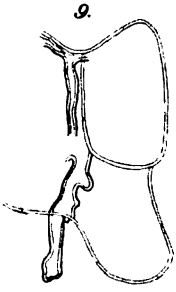

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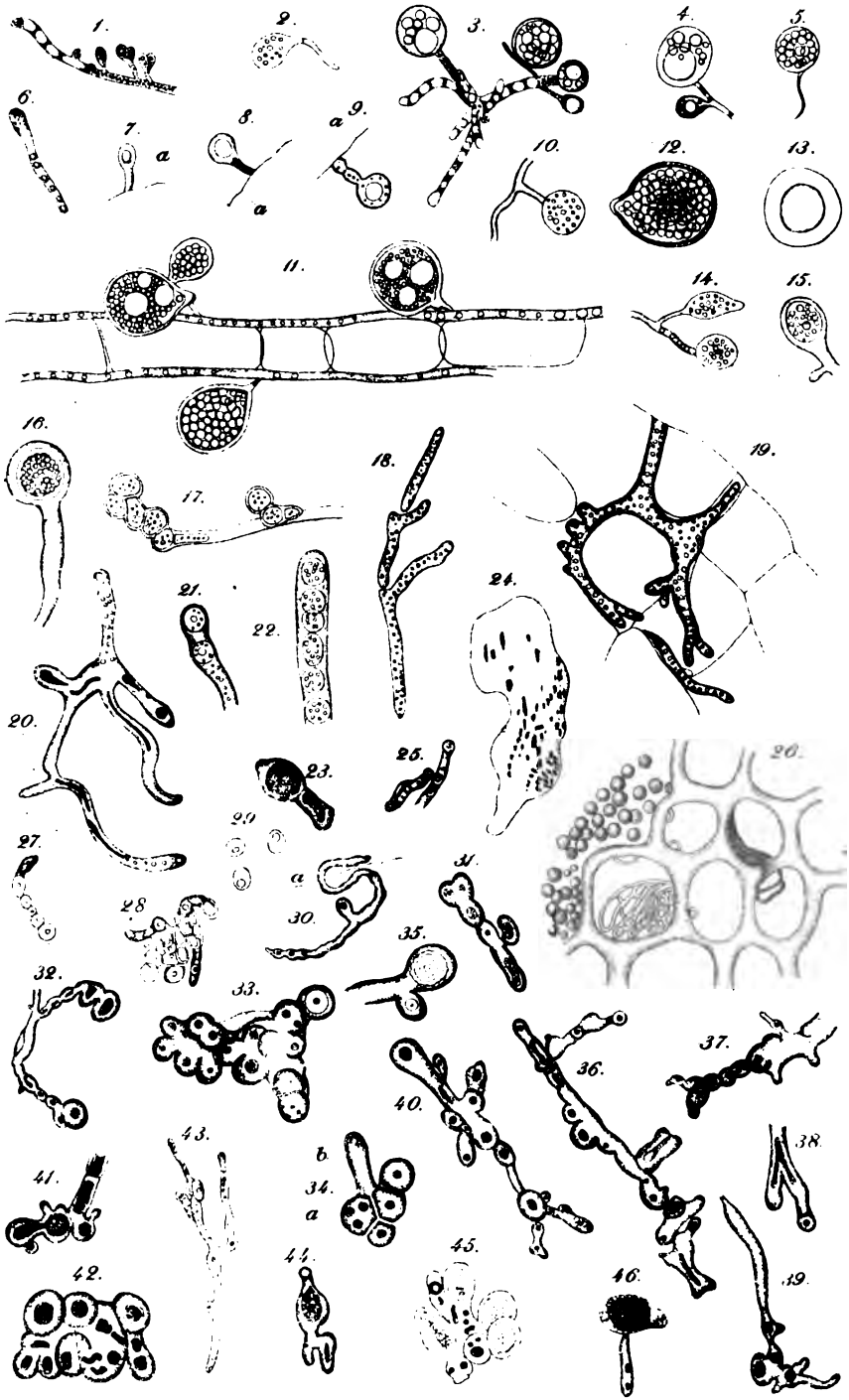

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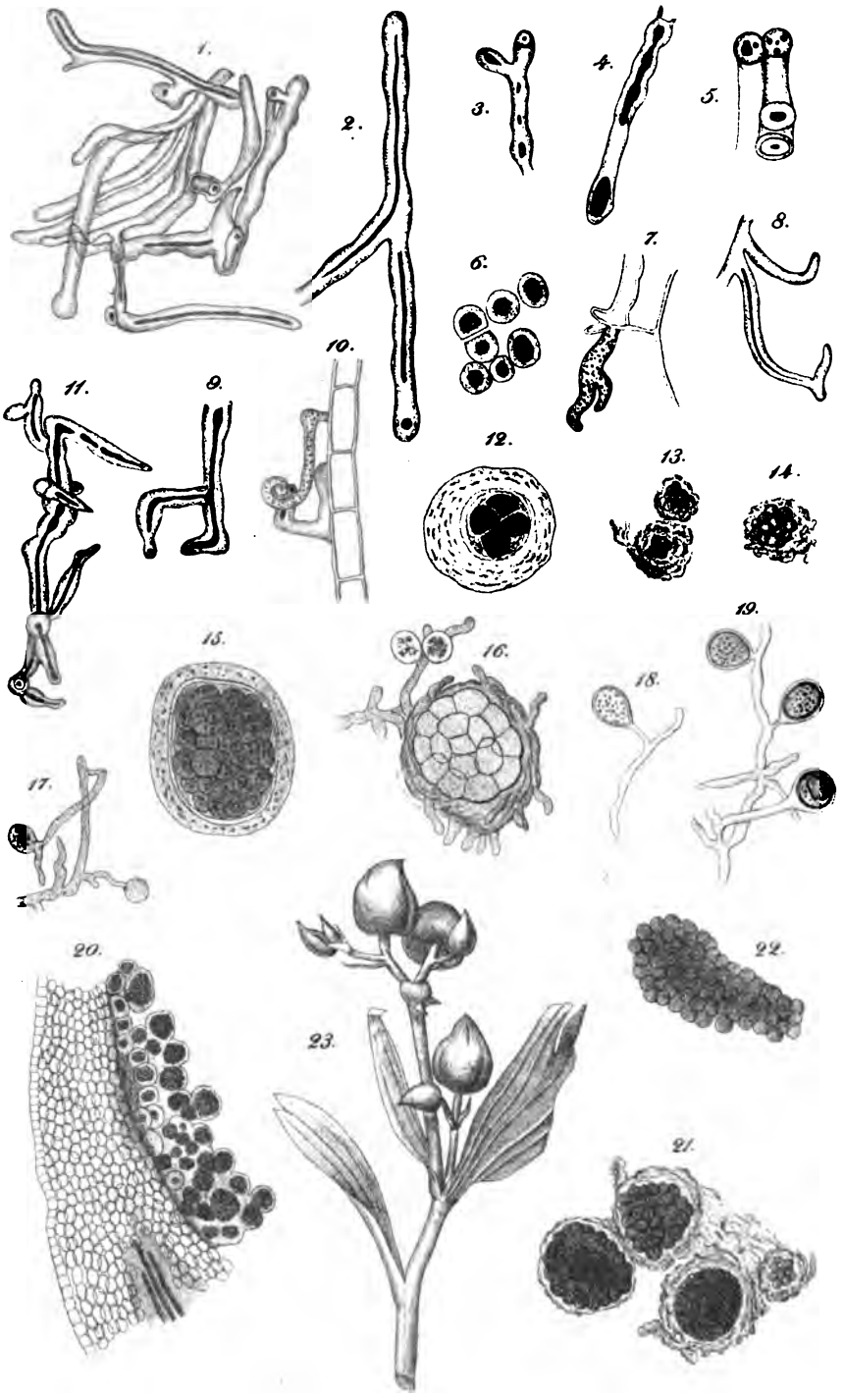

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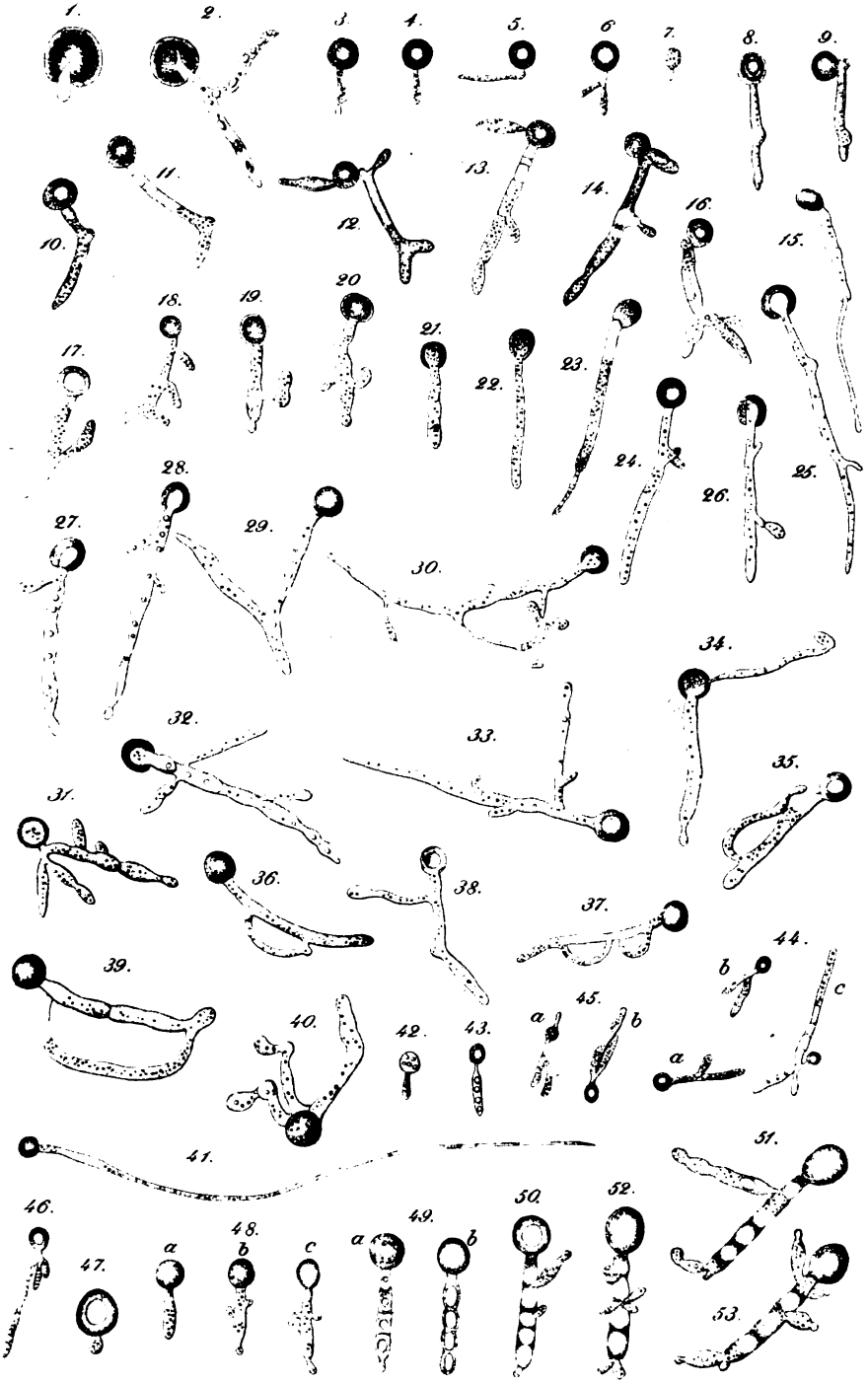

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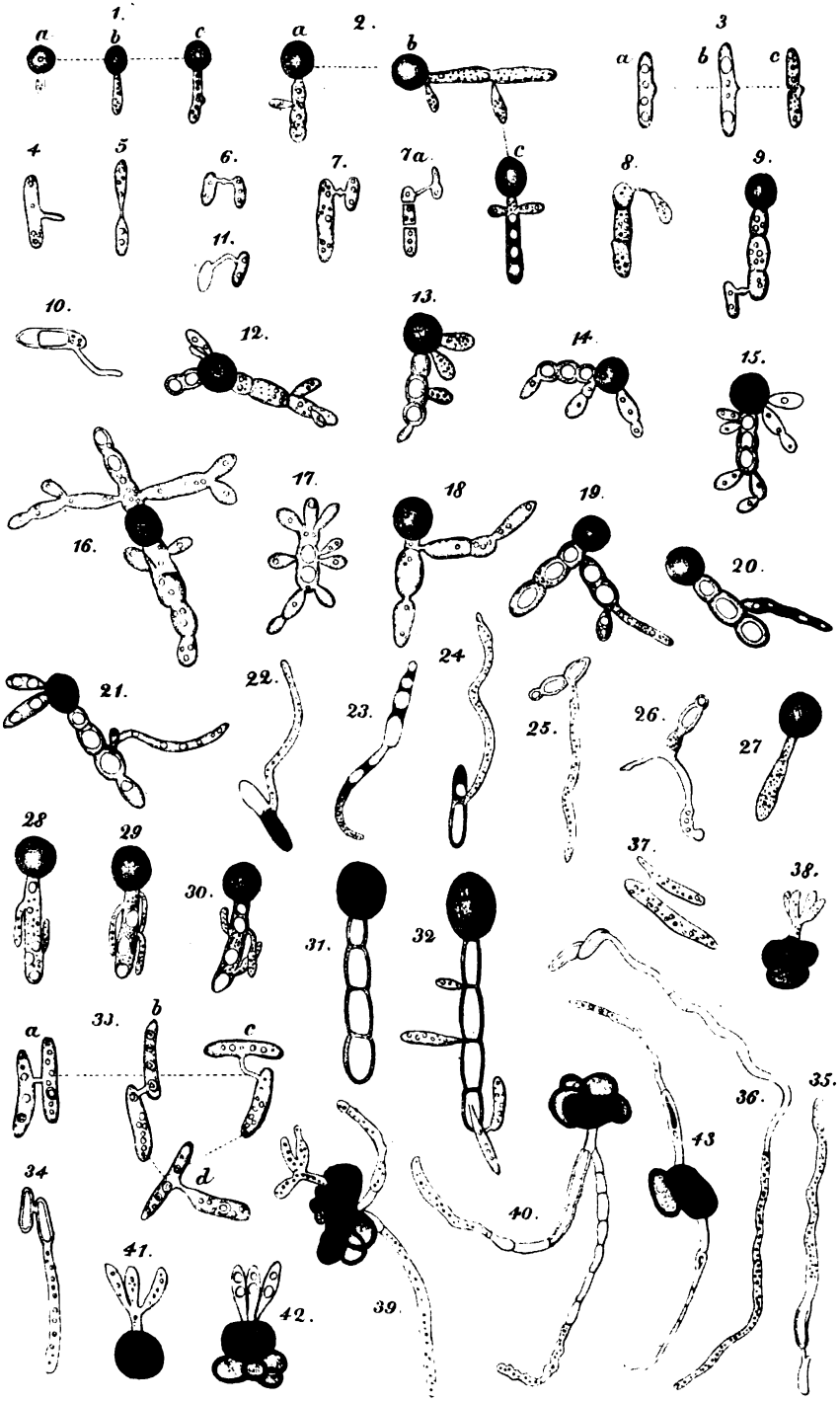

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FOURTEENTH REPORT

ON THE NOXIOUS, BENEFICIAL AND OTHER INSECTS OF THE STATE OF NEW YORK.

BY ASA FITCH, M. D., ENTOMOLOGIST OF THE SOCIETY.

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SCOLLOP SHELL, *Scotosia undulata*, Linn. (Lepidoptera. Geometridæ.)

The last of July, two or more leaves of the cherry fastened evenly together around their edges, and between them a pale, black-dotted measure worm, its back dull greenish with four white lines, and on each side a dark green stripe; its pupa under leaves on the ground through the winter, and in June producing a moth, with wings all occupied with alternate blackish and whitish wavy lines.

A delicate moth, an inch and a half in width, and known to English collectors as the scollop shell, from its resemblance to the ribbed shell thus named, is marked in a peculiar manner, the whole surface of both pairs of its wings being occupied with numerous wavy and zigzag lines alternately of a pale gray and a brown or blackish color, whereby it is easily recognized and remembered. It is said to be met with in woods, sparingly, but almost everywhere through the northern countries of Europe, and occurs abundantly in particular localities of limited extent. Upon this continent I have several times met with it in my own neighborhood, and it has been repeatedly found in Canada and Nova Scotia, and as far north as Hudson's Bay.

This moth has been well known in Europe for such a long period it is remarkable that none of the naturalists there appear to have discovered the measure worm from which it is produced, nor the vegetation on which this worm feeds. Though the old authors, a century ago, mentioned the sallow, *Salix caprea*, as being the tree upon which it is reared, our modern lepidopterologists make no allusion to this topic; whence it is evident the worm and its food is unknown to them.

On the first days of August, last year, I noticed that a young cherry tree growing in my yard had the two last leaves on the end of several of the branches and shoots curiously fastened together, face

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to face, their edges evenly meeting all around; the outer sides of the leaves being also convex, thus making a cavity between them and giving them the resemblance to the two valves of a clam shell; and their inner surface, which had been the upper side of the leaves, and also their parenchyma, had been extensively eaten by worms residing in the cavity between the leaves, there being but one worm in some of these cavities and in others two or three, and sometimes as many as five or six. The leaves at the end of the limbs and twigs are nearly or quite alike in their size and form, and the worm, by spinning from its mouth a fine silk thread and fastening it first to the edge of one leaf and then to the edge of the other, by making each successive thread as tight as it is able when fastening its end, manages to gradually draw two leaves together, with their upper sides facing each other; and when they are brought into contact, the worm, standing upon the edge of the two leaves, and carrying its head from side to side, fastens the thread it is spinning successively to the border of one leaf and the other as it steps backward, traveling around and around upon the outer edge of the leaves a multitude of times. This work is done, no doubt, by night, when no bird or other enemy is abroad to espy it when it is thus conspicuously exposed; and it is probably employed at this work for several successive nights, adding to the threads until a thin, paper-like tissue is formed over the united edges, thus wholly excluding any parasite or other insect enemy from entering its habitation. The threads of this tissue are placed lengthwise of the leaf and diagonally, none of them appearing to be transverse.

The worm lives in security between the leaves, feeding upon their pulp, until it is wholly consumed, except a slender border around the outer edge of both leaves—the skin of the under side of the leaves and the network of veins remaining and continuing to constitute a secure wall to the house in which the worm lives.. The two leaves do not furnish the amount of sustenance it requires to bring it to maturity, and when their pulp is consumed a third leaf is similarly drawed down and tied over one or the other of the two first, and then a fourth, till finally six leaves are usually tied together, though only a part of the last ones are eaten, portions of them remaining green. The first leaves die and become brown as other leaves overlay them, and with each additional leaf the nest becomes more convex and globular, till finally it forms an uneven ball or a short bag. On tearing these leaves apart one or more worms and a quantity of black grains, their feces, are found in the cavity inside.

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These worms are slender cylindrical, and grow to nearly or quite three-fourths of an inch in length. The surface of their bodies is smooth and without any raised points or ridges. Like other measure worms they have only five pairs of feet, one pair at the tip and another pair a little forward of these, being thick prolegs, and three pairs of slender true legs upon the breast. Some short fine erect hairs are scattered over the surface, arising from black dots. Along the middle of the back is a pale livid greenish stripe, bordered on each side by a rather thick whitish line, outside of which is a paler lurid greenish stripe of similar width to that on the middle of the back and having in it two black dots upon each segment, and on its outer edge a whitish line similar to that on its inner edge. Outside of this whitish line, along each side of the back, is a very dark green stripe, of the same width with the paler green ones inside of it, and having along its outer edge a yellowish white line. Below this line the sides are pale greenish yellow, with a slender yellowish white stripe upon an elevated ridge of the skin, there being on each segment two black dots above this stripe, the anterior dot being the breathing pore, which, more highly magnified, is seen to be a minute yellow dot inclosed in a black ring. There is also a black dot in this stripe and two below it, these last being usually margined with a yellowish white ring. Directly below the hind one of the dots last mentioned is another black dot placed in a slender broken faint yellowish white stripe. And forward of this dot is another, and below this still another, on the under side of the body. On the hind end of the back is a semicircular black spot; and there is a large black dot on the base of each of the hindmost legs. These thick prolegs are glossy, and of a pale yellowish and watery color.

These measure worms completed their growth on different days early in August, and then descended to the ground, crawling under dead fallen leaves and other rubbish, where they spun a few fine threads like cobweb upon the ground over and around them. They here cast their skins and appeared in their pupa form, usually having the small slender two-parted hook at the end of their bodies fastened into some of the cobweb threads. The pupa is glossy and of a bright chestnut brown color, its surface minutely wrinkled and with the abdominal segments coarsely punctured. It is 0.40 long and 0.12 thick. In this pupa state the insect remains through the winter.

In Europe these moths are stated to make their appearance the last of June, and this is the time I met with them in former years. But for six years past my specimens have all been captured nearly a month later, on the 20th of July, or within two days of that date; and seven moths reared in cages all came out upon the 18th of July and the three following days.

The moths measure 1.35 to 1.50 across their extended wings. They are ash-gray, varied with blackish markings and bands on the abdomen. The wings are all occupied from their bases to the extremity with numerous transverse lines or stripes, which are alternately ash-gray and blackish, fading to brown in specimens long preserved. These lines are wavy and frequently zigzag in places, forming right angles at each bend. On the fore wings, the number of blackish lines is usually sixteen. In some specimens these lines are quite uniform from the base to the hind

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edge; but, usually, a paler trace crosses the wings slightly beyond their middle. This is caused, commonly, by two of the black lines uniting, more or less, and forming a chain-like row of marks or a series of black rings, or sometimes merely black dots, these being most distinct toward the inner edge. In other instances this pale streak is produced by two or three of the ash-gray lines taking on a white color, or by one of the blackish lines becoming very much broken and effaced. Outside of the center of the fore wings, a black dot is usually perceptible to the eye. In one specimen before me, a short, brown, transverse streak on the middle of the costal edge is quite conspicuous, followed by a second similar streak at one-third the distance from this to the tip. The hind border of the wings is frequently tarnished brown or butternut color, traversed by a wavy white line. The basal fourth of the hind wings is gray, sprinkled more or less with blackish atoms not arranged in transverse lines. These wings are toothed on their hind edge.

This moth was named *Phalæna* (*Geometra*) *undulata*, by Linnæus, first in the tenth edition of his System of Nature, published in 1758, where he characterizes it as having bristle-like antennæ and all the wings above with transverse wavy blackish streaks, and living upon the *Salix caprea*. The specific name *undulata*, it scarcely needs to be mentioned, has allusion to the wavy or undulated streaks upon the wings. Being so distinctly marked, it has escaped from being mistaken and described under different names.

The generic name *Scotosia*, formed from a Greek word implying mist or gloominess, was first proposed by Mr. Stephens for three species of British moths, whilst he regarded this species as constituting another genus. M. Guenee, however, deems the differences between these insects so slight and unessential, that he unites them with still other species under one genus, in which arrangement other authors have since concurred.

These moths are probably nowhere so numerous as to cause any sensible injury to the cherry trees. But their larvæ tying the leaves together in such an artistic manner will attract notice wherever this phenomenon occurs, and will excite a desire for information respecting the insect which has this curious habit.

RASPBERRY BEETLE and WORM, *Byturus unicolor*, Say. (Coleoptera. Dermestidæ.)

Adhering to the gathered fruit of the red raspberry, a very small soft tarnished white worm, passing its pupa state under rubbish on the ground, and coming forth the latter part of May, an oval, pale dull yellow beetle, 0.15 long, densely clothed with short fine gray hairs.

Throughout our country there occurs on the fruit of the red raspberry a small white worm, which commonly remains adhering to the berry when it is gathered, lying usually on the inner side of the

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cup or cavity in the berry. Hereby the fruit is rendered unfit for the table or for preserving, until it has been looked over with the utmost care, and the berries closely examined one by one, each berry on which one of these worms is found being either thrown away or the worm removed from it. This picking over of the berries to cleanse them from these worms is a most irksome task, in which many hours of valuable time are every year spent in most of the households in our country. And notwithstanding this scrutiny, some of the worms no doubt remain, and are unconsciously eaten with the berries, it being impossible for the most piercing sight to detect them in every instance, especially those which are young and minute.

When examined with a magnifying glass, these worms are found to be plump and cylindrical, slightly tapered at each end, and nearly one-fourth of an inch in length when fully grown. They are white, each segment having on the back a broad, pale, tawny yellow band occupying more than half its surface, and being also furnished with a few short, erect, whitish hairs. The mouth is darker tawny yellow. On the breast are three pairs of legs, but none on the body back of these, except at the tip, which is prolonged into a single proleg of a short conic form, and blunt at its end; and on the apex of the last segment, above the base of the proleg, are two minute projecting points, appearing like two deep red dots.

When the worm is fully grown, it drops to the ground, probably with the fall of the berry in most instances, and secreting itself under any dead leaves or other rubbish which it there finds, it forms a cell in the dirt, in which it changes to a hairy pupa of a pale dull yellowish color, and in this situation remains at rest through the winter, and till the middle of May or a little later, when it changes to its perfect form, and is then a small beetle about twice as long as thick, varying in its length from 0.12 to 0.15.

This beetle is of an oval form, its opposite sides almost straight and parallel, quite convex above and flat on the under side. It is throughout of a pale dull yellowish color, sometimes tinged with chestnut brown, or reddish, and is covered above and beneath with exceedingly fine short grayish hairs, which are appressed to the surface and arise from fine close punctures, on the wing covers these hairs being finer and less visible. The head is small, roundish, flattened upon the face, and held vertically, sunk into the thorax to the eyes, which are rather large, black, round, and very convex and protuberant. The upper lip is transverse, its edge with a slight, broad, shallow notch or concavity. The antennæ are short, not reaching the base of the thorax when turned backward. They are thread-like, with their tips enlarged into a little knob the shape of an egg reversed. They are composed of eleven joints, which though distinct are compactly united. The basal joint is largest and gradually widens toward its apex. The two next joints are short and thicker than those

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which follow, which gradually but very slightly decrease in thickness to the three last, which are enlarged into the knob, and are more broad than long, the last joint being hemispheric and with the convex side outward. The thorax is more wide than long, scarcely wider across its base than its apex, convex above, and on each side abruptly depressed into a thin outer edge, which is much widened at the base, the basal angles being rectangular. The scutel is small, square, and rounded on its hind side. The wing covers are scarcely broader than the thorax, and have slightly elevated slender lines running lengthwise. The legs are of medium size, the hind pair longest, the thighs thick and stout and slightly narrowed at each end, the shanks gradually thicker toward their tips. The feet are more slender, their soles with dense fine hairs. They are five-jointed, the middle joints very small, the fourth joint minute and concealed between the lobes of the third joint; the last joint longest, equaling all the preceding joints in length, with a pair of small hooks at its end which are strongly curved and furnished with a prominent tooth at their base.

LETTUCE EARTH-LOUSE, *Rhizobius Lactucæ*, new species. (Homoptera. Aphidæ.)

On the roots of lettuce, often in great numbers; very small oval, white and pale-yellow lice, with dusky legs and antennæ, their bodies dusted over with a white powder.

The roots of the lettuce in our gardens are much infested by small white wingless lice, which begin to appear upon them early in the season, and multiply and become extremely numerous toward its close. When the lettuce is becoming too advanced to be longer useful for the table, and is beginning to shoot up to seed, upon uprooting it to clear the ground it occupies for other uses, the lumps of earth which break from around its rootlets will frequently be observed to be profusely pervaded with what appears to the eye to be a white moldiness. But on examining this white substance with a magnifying glass, it is found to be a white flocculent matter — a dry mealy powder — interspersed with short white down-like threads. And upon the slender rootlets of the lettuce will here and there be seen a small white louse, with its body dusted over with the same white powder, showing that the moldy appearance of the earth, which was first noticed, has been produced by these lice crawling through it and rubbing off a portion of the mealy coating of their bodies.

And when one of these plants is uprooted, on breaking off pieces of the ball of earth adhering to the roots and rootlets, cavities will be come to which are filled and crowded with a swarm of these lice, of all sizes, from the newly born infants to the full grown adult females, promiscuously heaped together in a confused mass, their bodies dusted over with the white mealy powder above mentioned, and the hind ends of many of them, and the backs also in some, coated with short flocculent fibres, giving them an appearance of being dressed with minute

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feathers. They are intolerant of the light, and when the cavity in which they are inclosed is opened, exposing them to the glare of day, they slowly crawl into the cracks and crevices in the ball of earth, one after another, and in a short time all disappear. Here and there among a cluster of these lice is seen a little white, woolly, rough, oval mass. This is a dead louse covered with pruinose and other refuse matter. In the cavities among the lice also occur drops of a fluid resembling clear limpid water, globular, of different sizes, the surface of the globules dusted over with the same white pruinose powder, which keeps them from uniting together when they chance to come in contact; this fluid probably being the honey dew secreted by the lice.

As these small underground lice are destitute of wings, they would be inferred to pertain to some of the Apterous tribes of insects. But, when they are closely examined, they are found to be so very similar to the plant lice, as to show the family *Aphidæ* to be their true place. In this family they constitute a distinct group or sub-family, to which M. Amyot has given the name *Geophthiri*, or earth-lice, (Annales Soc. Ent. de France, 2d Series, v. 485.) They differ from the plant lice in their underground residence, in their never acquiring wings, though it is of late stated that in rare instances some of them have been found with wings, in being destitute of honey-tubes, and in being always viviparous and never produced from eggs. They were formerly regarded as constituting a single species, which was named *Aphis radicum*. But, on coming to be examined more closely, it is quite evident that they are of several species. A number of these species have been named and described, constituting several distinct genera. They are met with not only on the roots of different plants, but also in the ground beneath stones, and in the nests of ants. And ants are always found associated with them. The little brown or dusky ant, *Formica nigra*, Linn., common in gardens, occurs in the cavities containing these lettuce lice, and in the earth around them. And these earth-lice are nursed and guarded by the ants, the same as are the plant lice. Upon raising a stone and finding several of these white earth-lice under it, the collector, after securing one of them, on looking to obtain a second specimen, finds they have all disappeared, having been taken away by the ants into their holes in the ground. And, as stated by Kirby and Spence, they are no doubt carried by the ants and distributed upon the roots of different plants.

This species upon the roots of the lettuce appears to pertain to the genus *Rhizobius*, of Burmeister, in which the antennæ have but five

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or six joints, the last joint being longer than those preceding it, and blunt at its apex.

The *young lice*, measuring but 0.02 in length, are very pale yellow, glossy and watery, with the legs and antennæ whitish. They are nearly thrice as long as broad, somewhat flattened, their opposite sides parallel in some, in others slightly widening backward and rounded at the tip. The transverse sutures are faintly perceptible. The eyes appear as minute black dots, one on each side of the anterior end. The antennæ are thread like, and only one-fourth the length of the body. When highly magnified, they appear to be four-jointed, the joints twice as long as thick, the first joint cylindrical, the two following ones thicker toward their tips, and the last one slightly longer than the others, and thickest toward its base. The feet are but one-jointed, half as long as the shanks, and end in a pair of hooks.

The *mature lice* are 0.08 long, their width less than half their length, some being much more broad than others. They are oval, and of a dull white color, with the legs antennæ and beak dusky, sometimes pale smoky with their bases nearly white, and in other specimens much darker and even blackish their entire length, with the end of the body also slightly dusky. The beak is appressed to the breast, appearing like a short dusky mark upon the skin, its tip scarcely reaching the base of the second pair of legs. The antennæ are shorter and more slender than the fore legs, thread-like and five-jointed, the joints cylindric. The two basal joints are slightly thicker than the following ones, and their length double their thickness. The third joint is variable in its length, in the mature females being almost double the length of the second, and but little shorter than the last joint, whilst in the narrower younger lice it is little, if at all, longer than the second. The fourth joint is the shortest of all, being but little longer than thick. The last joint is longest, and is bluntly rounded at its end. The sutures of the body are marked by slender impressed transverse lines. The feet show but one distinct joint, which is cylindrical, and four times as long as thick in the hind pair, shorter in the middle and anterior pair, with two hooks at the end.

The lettuce is such a thrifty, vigorous plant, that it does not appear to be perceptibly injured, however much its roots are thronged by these earth lice. Other vegetation which is more delicate and feeble has not a like immunity. Dr. Harris relates that upon pulling up China asters which appeared to be perishing from no visible cause, he found hundreds of these little white lice clustered upon the roots. Mr. Newcomb, of Pittstown, N. Y., informed me a few years since that little white lice gathered upon his verbenas, in some instances in such numbers as to completely cover the roots, causing the plants to droop and wither and turn yellowish, and when felt of they seemed loosened and not set firmly in the ground. He found tobacco-water to be an effectual remedy for these insects. By watering the earth around the plants freely with this decoction, he was able to promptly arrest the evil, and none of his plants died, as they inevitably would have done had they been neglected.

In addition to the ants, there occurred among these earth-lice

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numerous small white maggots, pointed at one end and blunt at the opposite end; and, also many pupæ of these maggots, the hard, outer cases of these pupæ being 0.15 long, and of a pale, dull yellowish color, one or both ends being darker, and of a brown or reddish brown hue, their head end being abruptly tapered and prolonged into a short projecting point, with its end cut off transversely, and their opposite end bluntly and unevenly rounded, and usually showing two small projecting points, frequently with two large blackish dots above them.

From some of these pupæ I obtained a small yellow fly, which I have frequently noticed alighted in the garden. It is closely related to the *Chlorops lineata*, Fab., and *C. tæniopus*, Meig., having the antennæ inserted upon a slight prominence of the forehead, three broad black stripes upon the thorax, and the fore feet black. I name this fly the Garden Chlorops, and a short description will suffice to characterize it and show that it is different from the species above named.

The GARDEN CHLOROPS, *C. hortensis*, is 0.10 in length, and, to the end of its closed wings, 0.15. It is glabrous and of a pale bright yellow color. On the thorax are three black stripes, which are slightly broader toward their anterior ends. The middle stripe is continued forward upon the head to the frontal prominence, narrowing to a point at its anterior end, and it extends backward only to the suture at the base of the scutel. On each side of the breast is a black dot, and forward of it a short black line, which narrows to a very acute point at its anterior end. The abdomen is black, with a narrow yellow border at its tip; it is flattened and broad egg-shaped, its length and width closely like that of the thorax. The face is white, and the last joint of the antennæ black. The fore feet are black their entire length.

WOOD TICK, *Ixodes Americanus*, Linn. (Aptera. Acaridæ.)

Common in the forests in unsettled sections of the country, and fastening itself upon man and animals; a flattened, obovate, chestnut red tick, having a white spot on the end of its scutel, and a whitish ring on its knees.

The most common tick of our country, called the wood tick from its inhabiting the woodlands, and not occurring in cleared and cultivated grounds, though formerly abundant throughout the northern and middle States, has now become nearly or quite extinct. The Swedish naturalist Kalm, in passing through the east part of our State one hundred and twenty years ago, when crossing from the Hudson river to Lake Champlain, speaks of the discomfort he experienced from the wood ticks with which the forests there abounded. At this day, along the route he pursued, not one of these insects can probably be found. Residing in that vicinity, I have never met with this wood tick except in a single instance. Forty

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years ago one was found in a decaying log in the forest. But specimens received from correspondents at the west and south show it to be still common in the new and sparsely settled sections of our country.

Its becoming thus extinct with the settlement of the country and the clearing off of its forests, is the more remarkable, since in other parts of the world ticks which are very similiar to this abound in old countries where all the tillable land is under cultivation, and even in thickly populated cities. I am informed by Mrs. Culbertson, late of the Presbyterian mission in China, that these insects are very common in that country. She states, that in the city of Shanghae, they are constantly fastening upon the dogs, sinking their heads into the skin of the dog and sucking his blood until they become enormously distended, appearing like a large sized bean adhering to the skin, of a shining bluish color. It is between the dog's toes that they are most prone to fasten themselves, where only the end of their bodies can be seen; and frequently the crevices between the toes are filled with as many ticks as they can hold, others becoming also attached upon the body at different points, distressing the dog greatly, and from pain and loss of blood he languishes and becomes puny, weak and emaciated, dull and spiritless, and dies if he is not relieved from his tormentors. It is the common custom, whenever it is discovered that a dog is much infested, to have a servant take him and by hand pick off every tick upon him.

In those sections of the country which were settled little over a century ago, tradition still speaks of the annoyances which our American wood ticks were, particularly when, in the heat of summer, the woods were traversed for gathering berries. And the account which M. Kalm gave of the habits of this insect to Baron De Geer, the correctness of which is also confirmed by Rev. I. Acrelius, who had been a resident of this country for several years, shows what a pest it was at that period, both to man and beast. He states that these ticks were found in the woods, the whole summer through, occurring there on the bushes and the plants growing among the bushes, but more particularly on the fallen dry leaves of the preceding year, with which the ground is covered; they are there so abundant that if one sits down on the earth or on the trunk of some fallen tree, his clothes and even his body soon gets covered with them; for though of a slow pace, they immediately climb upon his clothing, seeking some naked place on the body, on which they instantly fasten themselves by introducing their trunk into the skin. Those who go into the

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woods barefooted soon get their feet and legs thronged with them. They fasten themselves not only on man but also on animals, such as horses and horned cattle, which they frequently kill by fixing themselves in such very great numbers on their bodies, from which they suck the blood. They never inhabit the meadows or cultivated fields, or cleared lands, but always live where trees are growing. They pierce the skin in such a subtile manner that the person attacked does not at first notice their puncture, and only perceives it when they have penetrated so far that half their body is found sunk into the flesh; it is then that he feels at first a strong itching, and afterward a very severe pain at the place of the puncture, where a hard swelling occurs, the size of a pea or larger. It is then very difficult to get rid of the tick, for in endeavoring to draw it out it breaks asunder rather than to let go its hold, so that the head and trunk remain in the sore, soon producing an inflammation, followed by a suppuration, whereby the sore is frequently made deep and dangerous, and is accompanied with a most intolerable itching. It is, therefore, by cutting the flesh all around it that we must try to withdraw the tick entire from the spot where it is lodged. Or it is well to make use of a small pair of tweezers to draw it out, as M. Kalm states he had done with success. But the tick clings so strongly that in this operation one often tears out also a portion of the skin. M. Kalm states that he had seen horses which had the under side of their bodies and other parts so covered with these ticks, that the point of a knife could scarcely be introduced between them, and from being continually sucked by these cursed parasites deeply sunk into their flesh, the animals become so enfeebled, and are tormented so grievously that they eventually succumb and die in great misery.

Various authors have spoken of these ticks, and there has been some confusion respecting them, several distinct species of this country and South America having probably been included under the name *Americanus*. But the brief characters given by Linnæus, derived from the specimens obtained in this country by Kalm, make it sufficiently clear to what species this name rightfully pertains. He defines the *Americanus* as being obovate, reddish, with the scutel and knees whitish. It is very evidently the common wood tick of this country to which this description points.

The wood tick in its natural state, and not at all distended with blood, is flat as the common bed bug, to which it has a resemblance. It is almost circular, being little longer than wide, and is scarcely wider forward of the middle, or egg-shaped, with the pointed end backward, the form technically termed obovate. Specimens are

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variable in size, the largest measuring nearly or quite 0.20 in length. It is of a chestnut red, or sometimes yellowish color, with the abdomen commonly blackish. The thorax is glossy, closely punctured, with two impressed longitudinal lines, which are nearly parallel, with their forward ends more deeply impressed. A large white spot on the scutel is variable in its size. The abdomen is not glossy. It has a sub-marginal impressed line, and on its hind part two or three faint, longitudinal impressed lines are usually perceptible. The knees, and commonly the other joints of the legs are marked exteriorly with a small white crescent or a slender ring.

The ticks of our country which are most similar to this merit to be noticed in connection with it.

One of these, differing in being widest back of the middle and thus having an ovate form, and more largely covered with white, this color having a tallow-like appearance, of which I have received specimens from Virginia and from the Indian territory west of Arkansas, may be named and characterized as follows:

FIVE-LINED TICK, *Ixodes 5-striatus*. Ovate, rust-colored; thorax and scutel tallow white with irregular rust-colored spots and punctures; abdomen with punctures and five impressed longitudinal lines, the outer one on each side being sub-marginal; legs paler, their joints white. Length 0.20.

Another species, which was received in company with the preceding, from Rev. William S. Robertson, Tullehassie, Indian territory, I dedicate to its discoverer. It presents the following characters:

ROBERTSON'S TICK, *Ixodes Robertsonii*. Oval, punctured, rust-colored, above marbled with tallow white on the head, thorax and abdomen, with rust-colored punctures; abdomen with a sub-marginal impressed line, between which and the edge are deeply impressed, equi-distant, transverse lines with white interstices; joints of the legs white. Length 0.16.

TORTURING TICK, *Ixodes cruciarius*, new species. (Aptera. Acaridæ.)

An oval lead-colored tick, with chestnut-brown head and legs, which sinks its head into the skin of man and animals, gorging itself with blood; its wound intolerably painful and dangerous.

Dr. Gideon Turner, of White Creek, N. Y., has presented me with a specimen of a tick with which is connected a history of much interrest. I regret that a full written statement of this case, which I had been somewhat encouraged to expect, has never come to hand. A memorandum which I made from a verbal statement which was given to me, is to the following purport:

It was on a morning in July, 1868, that a daughter of Dr. Turner was awakened from her sleep by a most excruciating pain in one of her limbs. She immediately discovered that this torment was caused by an insect which, during her sleep, had almost buried itself in the

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skin, and had so filled itself with blood that it was distended to the size and shape of a bean. Of course no time was lost before removing this thirsty little blood hound. Notwithstanding this, the pain continued extremely severe, indicating the wound to have been poisoned by venom from the insect. To neutralize this poison, it was freely bathed with diluted aqua ammonia. She went to the school she was teaching and entered upon the day's exercises, but finding she was becoming more unwell, she was constrained to dismiss her school and return home. The surface around the wound became vesicated, as if from a plaster of cantharides, the whole limb became swollen, some slight convulsions occurred, and, for a time, her condition seemed rather critical. The medication, however, which was promptly resorted to, appeared salutary; the next day she was evidently better, and thereafter speedily recovered.

The following is the description of the above insect, drawn up from the specimen as it appeared when it was placed in my hands some time afterward.

Dimensions, 0.40 long, 0.25 wide, 0.10 high. Color of the body, gray, tinged with blue; anteriorly white, of a tallow-like appearance, here and there with a blackish dot or irregular blotch, six of these dots being in a transverse row on the neck. Head and legs chestnut brown. It is of an oval form, with a gentle contraction forward of the middle and narrower forward of this contraction than it is behind it, the ends bluntly rounded, flattened upon the back and also beneath; the back anteriorly sloping gently downward toward the head. The surface very finely and closely striated transversely. The head (in strictness termed the buckler or shield) is coriaceous and glossy, longer than wide, rounded, its sides back of the middle rectilinear for a short distance, and its anterior end cut off transversely. Its surface is punctured, the punctures minute and shallow, more dense on each side, where are two impressed lines which at their anterior ends approach each other. The beak is short, about a third of the length of the head. The back anteriorly is occupied by large irregular ridges and intervening hollows, which are mostly transverse or oblique. The middle and hind parts present three parallel, wide and deep longitudinal grooves, the middle one less broad, extending farther back, and ending anteriorly in a line with the contraction. Crossing the two interspaces between the longitudinal lines near their middle, is a transverse groove which is less deeply impressed. On the under side two large grooves begin at the throat, and, diverging from each other, extend the whole length, and between them posteriorly is a medial groove which reaches backward beyond the ends of the lateral ones.

Eleven years before this case occurred, in September, 1857, my young daughter found a small tick upon her arm, with its head sunk into the skin, and causing an intolerable pain, much more severe than the sting of a bee or a wasp. She had, just before, picked up a basket of chips under the wood-shed, where this had probably got upon her clothes. As it was instantly removed, the pain gradually subsided, a redness remaining at this point the next day.

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The description of this tick, which I drew up at that time, is as follows: Length, 0.10. Of a lurid dove color or leaden-blue, with an impressed furrow on each side of the back, the furrow slightly interrupted near its forward end; and, posteriorly, a similar furrow along the middle, extending a little farther back than the lateral ones, its anterior end more slender, and terminating about opposite to the middle of the lateral ones. Beneath, similar, but the lateral furrows almost in contact at their anterior ends, and diverging backward; and the middle furrow short, being merely a deep, oblong, oval indentation. The head, or clypeus, is crustaceous and shining, diamond shaped, with the posterior and lateral angles rounded and the fore end transversely truncated. It is finely punctured, with two impressed lines reaching almost its entire length, with a shorter line on each side between these and the outer edge. The head is of a pale chestnut color, as are also the beak and legs. These last are shortish, thread-like and equal in length, each composed of six short joints, about twice as long as thick.

Although this tick is so diminutive, and quite unlike the one first noticed in size and appearance, being thin as paper, whilst that is so plump and round that its thickness equals the total length of this, they coincide so exactly in color and sculpture that I doubt not they both pertain to the same species. The two impressed lines on each side of the head and the three furrows upon the back appear to be characters whereby, in connection with its leaden color, this species can be easily identified, whether in its ordinary gaunt state or obese from distention with blood. Though specimens in my collection show there are other species having three furrows upon the back, the furrows differ from those of this species, the middle one in particular being much longer here than appears usual for it to be.

Two descriptions of this tick have now been presented to the reader, one being of its appearance in its ordinary state, when newly captured, the other of its appearance when distended with blood and several months dead and dried. To render this account more complete, I will next present a description taken from a living specimen filled with blood, though not so fully distended as the specimen already described.

One of these ticks occurred firmly fastened upon the skin of a mink (*Putorius vison.*) On removing the skin a bright red inflamed spot, a quarter of an inch in diameter, was exposed on the inner side of the skin at the point where this tick was fastened; and on the whitish fascia of the muscle covered by this portion of the skin was a similar inflamed spot, indicating the excessive irritation and pain the animal had been suffering from this parasite.

The specimen measures 0.38 by 0.23, and is regular oval, with bluntly rounded ends. It is flattened and glossy, of a white color tinged with leaden blue, the head, mouth and legs being dark brown and shining. On the back are three dilated, impressed lines or grooves, which are uneven, the lateral ones being narrowed by a

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contraction toward their anterior ends. The middle groove commences farther back than the lateral ones, and its anterior portion is shallow. Posteriorly it is prolonged beyond the ends of the lateral ones. Beneath are two longitudinal grooves, and between their hind ends is an elliptic impression, in depth and width similar to the grooves. One and another of these grooves becomes small and slight, and again becomes deep and wide at the will of the animal when it is living; and in the lateral ones, on the back, a series of punctures, five in number, are at times quite conspicuous. And I notice the middle groove on the back at times becomes for a moment or two greatly increased in its depth and width, the lateral grooves simultaneously being almost obliterated. Over the whole surface are very close minute transverse striæ. The coriaceous chestnut-brown head has numerous punctures evenly scattered over its surface, and four impressed longitudinal lines, the two middle ones diverging backward. The two lines on each side incline to unite at their ends, thus inclosing an elliptic space.

It is slow in its motions, and though heavy and unwieldy, from being gorged with blood, it readily crawls up the side of a glass bottle.

It may be noticed that the blue tinge of the body in this species fades, and at length totally vanishes in specimens which are long preserved. The small specimen described above, which was first taken, is now changed to a dull white color. The specimen distended with blood is also dull white with some dark colored blotches and dots here and there. The specimen taken upon a mink has now become badly "greased," a casuality well known to collectors, rendering one and another of their specimens worthless, and for which there is no remedy that I am aware. Thus affected, this specimen, the body of which was originally bluish white, is now dark chestnut throughout, this being at first the color of the head and legs only.

Is the bite of these ticks venomous? Do they poison the wounds they make? This was a question on which there was some discussion and difference of opinion among persons in the vicinity of Miss Turner, some of those most intelligent on subjects of this kind being of the opinion that the bite of these insects was merely a simple wound. But the excruciating torment which it produces, we think, is a sufficient proof that the wound is poisoned. If it were a simple wound like that made by a sliver of wood, removing the irritating substance would immediately alleviate the pain. But, here, the pain continued intolerable for hours after the insect had been removed. Moreover, the fact is well known that some of these ticks are extremely venomous. One of the most noted of these is the Persian tick, *Argas Persicus*, locally termed the Malleh, and known to travelers as the Venomous bug of Miana, the species being most common and dangerous in that city in northern Persia. As showing the habits of these insects more fully, and the symptoms produced by their bite,

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we extract what follows from the account of the Miana bug, given by M. Kotzebue, in his Travels in Persia, in 1817, as cited by Walckenaer and Gervais in their Natural History of Apterous Insects, although some of the statements have a savor of the proverbial exaggerations of travelers. The European bug, with which he compares that of Miana, we suppose to be the common bed-bug.

This dangerous insect, called the Miana bug, is a little larger than the European bug, and is blackish gray, sprinkled on the back with a multitude of red points. It conceals itself in the walls of dwellings, frequenting in preference those that are old. In these the bugs are found in great abundance, and their prick is most dangerous. They never show themselves in the day-time, and are also afraid of light, though the glare of lamps and candles does not always put them to flight. They have infested Miana from time immemorial, and scatter themselves out into its suburbs, where they are a little less dangerous. During winter they remain motionless in the holes of the walls, and, like all venomous animals, it is in the greatest heat of the summer that their poison has the most activity. What is most marvelous of these bugs is that they do not attack the native inhabitants, or, at least, the puncture which they make in them has no more grave results than that of the bugs of Europe; but, in return, they make a cruel war upon strangers who have the misfortune to pass a night at Miana, often causing their death in less than twenty-four hours. Of this I have heard two instances related.

The English residents at Tabreez unitedly declare that they at Miana lost one of their servants who was attacked by these terrible insects. He soon after felt a violent heat all over his body, fell into a kind of delirium, and finally expired in terrible convulsions.

From others I have received information, equally credible, about Colonel Baron Wrede, who some years ago was sent as Russian ambassador to Persia. It was quite late in the season when he passed Miana, and thinking there was then nothing to fear from the bug, he rested there over night, but with the precaution of having a candle lighted in his room. He experienced no evil, but a Cossack in his retinue, the next morning had a black spot on his foot, took to talking wildly, and at length fell into a paroxysm of frenzy. The inhabitants advised a remedy they used in such cases. This was to skin an ox and envelope the foot in the warm hide. Recourse was had to this expedient, but it was of no service, and the poor Cossack died in woful agony. We are assured that this measure is commonly successful, but it is also necessary that the diseased person remains forty

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days without taking any food or drink but sugar water and honey. As already stated, the natives of Miana take these bugs into their hands without any danger. How fortunate it is that these formidable insects do not nestle in the clothing, for they would soon be carried all over Persia.

TOOTH-ACHE MITE, *Ixodes? Odontalgiæ*, new species. Aptera Acaridæ.

A minute brown mite with pale margin and legs, the penultimate joint of the latter longest, the end of its body transversely truncated and strongly notched in the middle. Found on the root of a newly extracted tooth.

In addition to the ticks and mites which infest the skin of man and animals externally, are others which are internal, occurring in different parts of the interior of the body. One of the most common and best known of these is the itch-mite, *Sarcoptes Scabiei*, which abounds in the pustules of the human itch. Other mites occur in ulcers, and like the itch-mite may communicate the same ulcers to other persons. An interesting case in proof of this is reported in Cooper's Microscopic Journal, 1842, vol. ii, p. 65. A negro sailor was received into the Seaman's Hospital Ship, affected with large ulcers on the soles of his feet, of a peculiar character. He appeared to have received this malady from wearing a pair of shoes a day or two, which he had had from another negro whose feet were similarly diseased. In these ulcers a mite occurred, a figure of which is given, which shows it to be a species quite different from the itch-mite. This sailor had come direct from the East Indies, from a locality where no such malady as this was known. The other negro was from Sierre Leone, where, it is stated, a sort of itch is prevalent, which ulcerates and is very difficult to cure. It is added that in some water from the Sinoe river, on the coast of Africa, a whole mite and broken fragments of others were found, similar in every respect to the one from these ulcers.

It is reported that in one of the quarters of Paris at a former period persons were frequently affected with mites under the eyelids, which a woman there became considerably noted for removing with a silver needle. Another species, named the dysentery-mite, from its abounding in the evacuations of dysentery patients, is stated to occur in all parts of the alimentary canal. And even in the brain these insects have been met with, both on its surface and deep in its interior. Hermann reports that in the *post-mortem* examination of a soldier who died in the military hospital of Strasburg from a fracture of the skull, on separating the two hemispheres of the brain and taking out the pia-

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mater, a mite was seen running upon the corpus callosum near the pineal gland. He also states that M. Lauth, professor of anatomy, showed him a little insect he had found near the base of the brain, on the surface of the pituitary gland, in a deceased maniac in the hospital, which everybody took to be a crab-louse, but which Hermann knew to be a species of mite closely resembling in size and color the *Acarus cellaris*, which he frequently met with in the moist earth in a corner of his cellar.

There can be little doubt that in many cases these mites are present in one part and another of the body, and that under certain circumstances they occasion lesions and diseases, of which the most competent members of the medical profession are unable to conjecture the cause. I here present an interesting instance of this kind:

A young lady applied to Z. Cotton, dentist, now some years located at Cambridge, N. Y., to extract a tooth from which she was suffering much pain. He found the tooth complained of to be perfectly sound and all its surroundings healthy; he therefore felt averse to removing it, and proposed a resort to soothing, external applications, whereby the pain perhaps would after a time pass away. It, however, was occasioning her so much torment, no external applications having given the slightest relief, that she insisted upon having it taken out. He accordingly extracted it. On then inspecting it, he could perceive no traces of caries, ulceration, or other disease which should cause it to have been painful. While thus looking attentively at the tooth, he noticed, by its moving, that there was a minute insect upon the side of the tooth, partly between its roots. This was a discovery indeed. From the place where it was located when it was first seen, Mr. C. is confident it was not situated between the fleshy gum and the tooth, nor could it, in extracting the tooth, have been rubbed from off the gum to be at the point where it was. Evidently it was situated a short distance within the alveolus, insinuated into the suture between the tooth and the wall of its bony cavity. And he thinks, with reason, it was this mite that had caused the pain which the patient had experienced in this tooth.

He inclosed the specimen in a small vial and presented it to me. As the dysentery-mite, *Sarcoptes Dysenteriæ*, occurs in the mouth as well as in the stomach and intestines, I suspected this would perhaps be that insect, or a species very similar to it. But it proves to be quite different. It is so minute, and the specimen is so contracted in drying, that I am unable to draw from it a description that is complete and perfect. The characters which follow, however, are ample

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to enable the species to be clearly identified by an observer who has a specimen of it in his hands.

This mite is about 0.015 long. Its body is opake and of a brown color, like the weathered surface of wood, its border all around being pale, as are the legs also. It is nearly square or quadrangular, and as broad as long, or perhaps somewhat broader across its fore part, and slightly shouldered or humped on each side. Its anterior end is rapidly narrowed and prolonged in the middle into a beak, having the feelers appressed to its sides. The feelers are three-jointed, the first joint only being seen when viewed from above. This joint is cylindric, a third longer than thick, and reaches slightly beyond the end of the beak. The second joint is shortest and held perpendicularly downward at right angles with the first and third, which last is longest and more slender, over twice as long as thick, and held horizontally backward. They are all bearded with inclined bristles on their outer sides. At its hind end the body is cut off transversely and is conspicuously notched in the middle, the notch abrupt and somewhat square, more wide than deep, with a convex projection or small lobe in its middle. Close upon each side of this notch are two coarse bristles projecting backward. The eight legs are about equal in length, more than double the length of the body, thread-like, bearded with inclined bristles, which are coarser toward the feet. They are six-jointed, the basal joint more short and thick; the second, third and fourth joints equal, cylindric and thrice as long as thick, the second and third having each a long coarse bristle arising from their middle, and the fourth having some coarse, thorny points at its tip, and one near its middle; the fifth joint a third longer than the preceding joints and slightly tapering; the sixth joint more slender and shorter than the sub-basal joints, and ending in a long conic point, except in the fore legs, which terminate in a triangular pellet.

EARWIG-FLY, *Merope tuber*, Newman. (Neuroptera. Panorpidæ.)

A singular insect, forming the type of a new genus, and in several of its prominent characters quite dissimilar to the insects to which it appears to be most nearly related, was discovered in our State, at Trenton Falls, by the late Edward Doubleday, in the year 1837. He met with only a single specimen, a female. From this specimen a short description was drawn by E. Newman, and published the following year in the Entomological Magazine, vol. v, page 180. Mr. Newman there named it the *Merope tuber*, the generic term *Merope* being the astronomical name of one of the smaller Pleiades or stars arising to view in the spring of the year; and the specific name *tuber* having allusion to a remarkable appendage of this insect, a small semicircular callus, like an excrescence, growing upon the inner edge of its fore wings near the base. This unique specimen was subsequently examined and its mouth was carefully dissected by Mr. Westwood, who communicated a more full description, with figures of its several parts, to the London Entomological Society, which was published in the Society's Proceedings, vol. v, plate xiv, fig. 2, *a* to *l*.

Of this rare and remarkable insect, I, eighteen years ago, captured

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a specimen, which is a female. The past season I have been so fortunate as to meet with it again, the specimen now obtained being a male, showing this sex to be still more of a paradox than is the female. I know not whether any other specimens of this insect have ever been found. It is an object of so much scientific interest that I here present an account of it:

Whoever meets with the male of this insect, his notice will first be attracted to the remarkably long, stout pair of forceps with which it is furnished, giving to its long, narrow body such a close resemblance to an earwig (*Forficula*) that he will think it probably pertains to that family of insects. But on coming to see that its wings are of ordinary structure, filled with fine longitudinal veins; that its feet are five instead of three-jointed; that its head is retracted and almost entirely hid under the thorax, with the face flattened and held backward, the mouth pressing upon the breast, and with the eyes kidney-shaped and the antennæ inserted in the notch on their inner side, his second thought will be that it is a cockroach (*Blatta*) furnished with a forceps, and thus giving it a relationship to the kindred group *Forficula*. It is not till he happens to observe that the four wings, though broad and hyaline, with the first pair smoky, and thus resembling wing covers, are yet alike in size and are destitute of any plaits or folds, that he becomes aware it may pertain to the order NEUROPTERA instead of ORTHOPTERA, where its resemblances to an earwig and a cockroach would place it. Even then, he notices so many points in which the specimen appears more like the insects of the latter than of the former order (the broad costal or outer area of the wings, no spot in this area answering to a stigma, no small eyes, etc.) that he is in doubt whether it may not be an Orthopter with wings not perfectly developed, as is the case with several of the species of this and other orders.

To ascertain if it pertains to the Neuroptera, he searches through this order for insects having the end of the body equipped as it is here, but he nowhere finds any which are described as corresponding with it in this particular. The only approach to a structure of this kind appears to be in the family PANORPIDÆ, where the males have the tip of the body furnished with a pair of claws or hooks much resembling the jaws of many insects, these hooks having their sharp points directed forward over the end of the back, their size, form, and position being quite unlike the forceps of this insect. And when he reads that "this family PANORPIDÆ is at once distinguished by the front of the head being produced into an elongated slender deflexed

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rostrum," "the head vertical, its anterior end prolonged and narrowed in the form of a proboscis;" as the insect in hand has only a short nose or snout, not prolonged into a slender narrow proboscis, and the head not held vertically downward, but horizontally backward, with the mouth pressed upon the breast; he concludes in full confidence that it cannot pertain to this family. And, on comparing it with the other families of this order, he finds no place where it appears to belong. So anomalous is it, that the student in this science will be embarrassed by it in whatever direction he turns. Even Mr. Newman, though he had made the insects of this order his particular study, was unable to decide as to the particular family to which it pertains.

By dissecting its mouth, Mr. Westwood obtained such details as to show the family *Panorpidæ* to be its true place, notwithstanding it differs so notably from all the other genera of this family as to make its association with them appear quite incongruous. And it is not that it is intimately related to them, but that it is more nearly related to them than to the genera of any other family that makes this family its true place.

The following are the points in which this insect corresponds with the typical genera of this family: 1st. The upper lip is prolonged to an acute point, forming with the other organs of the mouth a beak or rostrum, which is the essential distinction of this family, although here this beak is short, scarcely longer than thick, whilst there it is long and slender, four times as long as thick. 2d. The upper jaws are longer than wide, and have two sharp teeth at their tips. 3d. The maxillary feelers are thread-like and five-jointed, the joints little longer than thick, the last one oval. 4th. The veins of the wings coincide with those of the genus *Panorpa* more closely than with those of any other insects of this order. 5th. In the female the body gradually tapers to an acute point, which is furnished with two minute threads which are here two-jointed, and in *Panorpa* three-jointed. And 6th, as we now know, in the males the tip of the body is armed, the armature here being a pair of very long stout forceps, whilst there it is a pair of stout sharp hooks.

But the points in which this insect differs from its associates in this family are much more numerous and notable. Allusion has just been made to the great dissimilarity of their beaks, short, and turned backward in the one, in the others long and slender, and hanging down in front like the trunk of an elephant; and of the armature at the end of the body in the males, which is here, a formidable pair of forceps held

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horizontally backward, and almost equaling the insect's body in length; there it is merely a pair of small hooks directed upward and curving forward over the end of the back. Other differences, equally important, merit to be noticed. The head, instead of being prominent, and fully exposed as it is in *Panorpa*, *Bittacus* and *Boreus*, is retracted, and almost totally hid under the fore part of the thorax. The eyes, which are protuberant and subglobular in those genera, are here but little elevated above the surface, and are long, narrow, and curved, or kidney-shaped. The three glassy simple eyes, which are so conspicuous in the two first named genera are here wholly wanting. The antennæ, instead of being long and thread-like, or like a fine hair, are shortish and thick. The first segment of the thorax, instead of being a ring or hoop forming a kind of neck to the head, is flattened, forming a semi-circular plate. The body is long, narrow and flattened, not slender and cylindrical. The wings are not shining and glass-like, and are not at all ornamented with spots and bands as they are in the other genera. And the small semi-circular lobe on the inner margin of the fore wings, near the base, is a singular appendage, whereby this species is at once distinguished from all others.

Readers intelligent upon this subject will be aware from what has now been stated, that this insect differs widely from those with which it is associated. In this family PANORPIDÆ, however, each of the groups are very distinct. Though there is a beautiful similarity to the species of each genus, the few genera composing this family are each remarkably different from all the others. They hence form a very heterogeneous assemblage, as will appear from a cursory review of them.

In the genus *Panorpa*, or the scorpion-flies, the body and its members are of ordinary aspect, with nothing peculiar that is perceptible to the eye, except the end of the body in the males, the last joint being very large and egg-shaped, and the two joints preceding it remarkably small, appearing as if atrophied, this structure giving free motion to the tip of the body, enabling it to turn in every direction like the tail of a scorpion.

In *Bittacus*, the body, wings and legs are remarkably long and slender, giving these flies a striking resemblance to the crane-flies or daddy-long-legs of the genus *Tipula* in the order DIPTERA.

Boreus contains very diminutive insects, scarcely one fourth the dimensions of their kindred. They are destitute of wings, and move by feeble skips on the surface of the snow in winter. The genus has only three species, one in Europe, long known, and two, which I have described, in this country

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In these three genera the heads are quite similar, being prolonged into a long slender beak or proboscis; and in the males the end of the body is furnished with a pair of stout, sharp-pointed hooks.

The genus *Nemoptera* is remarkable for the singularity of its wings. Although the order NEUROPTERA is defined as having four wings of equal size, we here have a genus of that order in which the hind wings are double the length of the forward pair, and are exceedingly narrow and slender, like blades of grass, and the wings remain spread apart when the fly is at rest.

Finally, the genus *Merope* differs from all the preceding genera in having the head withdrawn under the thorax, the eyes kidney-shaped and several other characters which have already been stated; the fly resembling a cockroach, the males having forceps like an earwig.

These two genera have the head slightly prolonged, and forming a short beak or snout; they have no small simple eyes, and their maxillary feelers are short, not reaching beyond the jaws. They evidently constitute a subfamily separated from the three first genera by the shortness of their beak. Dr. Rambur, who was unacquainted with the last genus, elevates *Nemoptera* to the rank of a family (Neuropteres, page 332), which he characterizes as having the hind wings very long and nearly linear. But it being the distinctive mark of the family PANORPIDÆ that its mouth is prolonged into a beak, the great difference which exists in the length of this beak is the most natural and perspicuous character on which to found a primary division of this family. And thus the two genera, *Nemoptera* and *Merope* will constitute a subfamily, NEMOPTERIDES, having the beak short, little, if at all, longer than thick.

Two or three facts are all we as yet know of the habits of this rare and anomalous insect. It comes abroad in its perfect state from the middle till the end of the month of July. It flies around in the night, and probably secretes itself and remains at rest during the day. It is attracted by a light, and by night flies into the lighted rooms of dwellings through the open windows and doors. It was in a lighted parlor that my specimen of the female was taken, it having entered at an opened window. The male occurred running among the papers on my writing table, having no doubt flown in at the open door and alighted on the table unobserved. From its aspect and motions I confidently supposed it to be a cockroach, until in securing it its formidable forceps were seen. Thus by its habits also this insect is related to the genus *Nemoptera*, one of the species of which is stated by Olivier to enter houses by night, attracted by the light.

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This insect is of a dingy brown color, its abdomen dull pale yellow, and its legs and the forceps of the male yellowish white. Its wings are hyaline but not clear and glassy. They have a tinge of umber brown, the fore pair perceptibly deeper tinged with this color than the hind pair.

The male is larger and his body more robust than the female, measuring 0.40 in length to the end of its tail-like appendages, and to the end of the forceps 0.65. The forceps are joined to the body obliquely on each side of its end, their entire length being 0.32, which is also the length of the body forward of their base. The extended wings of the male are 1.20 from tip to tip. The female is 0.30 long and 0.95 wide across its extended wings. The dimensions of the Doubleday specimen are given as 0.35 in length and 1.05 in width.

The HEAD is almost totally hid beneath the thorax. When viewed on the under side it is more long than wide, its outline is oval, flattened and turned backward horizontally, with the mouth pressed upon the breast and reaching a little beyond the base of the first pair of legs. Its sides are occupied by the eyes, which in the female almost meet together on the vertex or crown of the head, being parted asunder merely by a slender elevated ridge, which has an impressed line along its summit. In the male they are more widely separated, the vertex or space between them being more long than wide and narrowing forward, where it is also grooved along the middle. In both sexes the vertex is black without any glossiness. In front the circular space between the eyes is smooth and shining, black in the male and chestnut brown in the female. The face below the eyes is dull whitish and glossy, the surface slightly uneven from three faint transverse elevations, which are parted asunder by shallow impressed parallel lines. Below this the upper lip is prolonged downward, and viewed in front with a common magnifier, appears like a cone twice as long as thick and gradually tapered to a sharp point. The jaws have on their outer side a dense tuft of yellow hairs, in which their tips are hid from view. The feelers are small, reaching only to the end of the jaws. They are dull whitish, thread-like and five-jointed, the joints little longer than thick, the last one oval. To Mr. Westwood the last joint appeared to be formed of two rings. He found the upper jaws to end in two sharp curved teeth, and inside of these a third obtuse one; the lower jaws two-lobed, their tips conic, and the lower lip nearly square, its anterior angles rounded and fringed with hairs, and furnished with a pair of short, two-jointed feelers. The *eyes* are coal black, their surface finely granular. They are slender, kidney-shaped, four times as long as thick, their lower part narrower than the upper. No simple eyes are perceptible in either sex. The *antennæ* arise in the lower part of the notch of the eyes, and are almost in contact at their base. They are alike in the two sexes, short and thick, about half the length of the body in the female and a little more than a third its length in the male, thickest forward of the middle, and gradually tapering in both directions, toward their tips becoming very slender. They are dark dingy brown in the male, pale brown in the female, the basal joint pale dull yellow. They are composed of thirty joints, which are about as long as thick, and are distinctly separated by contractions between them. The basal joint is thick, its diameter similar to that of the thickest middle joints, and rounded at its summit. The second joint is small, but half as thick as the first. The third joint is slightly longer than thick, and gradually widens from its base to its apex. The following joints increase very gradually in thickness to about the eighth joint, from which to the twelfth they do not perceptibly differ in size, and beyond this they begin to diminish.

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The THORAX has its first segment flattened and semi-circular with the sides strongly inclined downward, and in the female so much deflected, that when viewed from above this part appears square and as long as wide, with its opposite sides parallel and its anterior end convex. In its middle is a longitudinal ridge with an impressed line along its summit, and on each side is a raised line extending obliquely outward and forward, these elevations not reaching the basal edge, and in the female less prominent. The second and third segments are alike in size and form, similar in length to the first, but a third broader. The first and second segments are dark dingy brown, the third dull pale yellow.

The ABDOMEN is smooth and glossy, soft and flesh-like, of a pale dull yellow color. In the *male* its color is more dull and its substance more firm, its width the same as the thorax, its opposite sides parallel, scarcely narrowing toward the tip. In this sex it has eight segments, distinctly marked by an elevated line on their hind margins. The first segment is longest, and is narrowed on each side concavely from its base to its middle, and from thence widens to its hind angles. Its surface is uneven from large smooth elevations and intervening depressions, a large roundish elevation occupying its central and anterior part, and on each side of this a smaller and somewhat triangular one occupying the anterior corners. The second segment is short, less than half the length of the first, and on each side widens from its anterior to its hind angles. The four succeeding segments are larger, equal in size, each about twice the length of the second. The seventh segment is shorter, and the eighth still shorter, the two together being only equal in length to the sixth. The last one is followed by a triangular plate or ninth segment, which is transverse, nearly double the length of the short eighth segment, but not equaling it in width, with its apex rounded; and from under its edge is protruded two narrow triangular appendages, flattened and membranous, about 0.03 long, gradually tapering to a very acute point, and overhanging the angle formed at the inner base of the forceps.

The *forceps* are hard and horny, project horizontally backward, and are regularly curved, each blade in the form of a slightly bent bow. The blades are each composed of two pieces articulated one to the end of the other. The basal piece is double the length, and double the thickness of the apical. It is slightly thicker at its base, where it is articulated to the whole length of one side of the triangular plate, and to the outer end of the hind edge of the eighth segment. It is flattened its whole length, both on its upper and its under side, whereby it is more than twice as broad as thick. The apical piece at its tip is abruptly and strongly compressed, and widened to thrice its preceding thickness, and is concavely notched, this dilated portion having the form of a crescent, placed vertically, with its horns projecting obliquely backward and inward—this last joint of the forceps being thus analogous in its form to the top of the spire of a Turkish mosque, ending in a crescent placed transversely. The surface of these grappling organs is closely bearded with inclined hairs, which are very short and minute on the first, and much longer and coarser on the last joint.

In the *female* the abdomen is simple, narrower than the thorax, flattened, and beyond its middle gradually tapered to an acute point. It is composed of seven segments, one less than in the male, all but the last corresponding in length with those of the male, and the basal one similarly sculptured. The seventh segment is of equal length with those forward of it, and like the sixth is strongly narrowed from its fore to its hind end, where it is transversely cut off, and from its end is protruded a cylindrical tube, as it appears when viewed from above, which is twice as long as thick, and nearly the length of the segment to which it is appended. And from the end of

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this tube hangs downward and diverging outward, two small thread-like appendages, which are two-jointed, the joints twice as long as thick.

The LEGS are long and slender, the hind pair slightly longest. They are densely coated with a fine short incumbent beard, and the shanks have a pair of spurs at their tips. The feet are five-jointed, the joints cylindric and successively diminished in length, the last one ending in a pair of small black simple hooks.

The WINGS are laid flat upon the back, one upon another when the insect is running or at rest. They reach much beyond the end of the body, being almost double its length, and in the male cover and hide from view the forceps. The four wings are nearly alike in size, form, texture, and in the number and position of their veins. They are thrice as long as wide, the fore pair being slightly longer and narrower, gradually widening from their bases through two-thirds of their length and rounded at their ends, thus being elongated egg-shaped. They are destitute of any plait or fold, and are pellucid and faintly smoky, the anterior pair perceptibly more so than the hind pair. Along their inner side they are slightly fringed with extremely fine short hairs, which incline backward, and on their outer side are similar hairs incumbent upon the marginal vein. Their disk is occupied by numerous veins running lengthwise of the wing, nearly equidistant from and parallel with each other, some of them forked. They are blackish in the fore wings of the male and pale brown in the hind wings. In the female they are pale brown in the fore wings and dull whitish or colorless in the hind wings. They are connected together by many small and more slender transverse veinlets of a whitish color.

The outer portion, or *costal area*, of the wings is broad and widened toward its middle, thus appearing like the wing of an Orthopterous rather than a Neuropterous insect, and it is destitute of any discolored spot or stigma toward its tip. On its inner side this area is traversed lengthwise by a slender slightly flexuous and nearly colorless vein, which terminates in the marginal vein. Along the outer side of this vein at irregular distances are short oblique veinlets, about twelve in number, connecting this longitudinal vein with the margin. About five of the first of these veinlets are straight and closer together, forming short rhombic cells between them. The succeeding veinlets become more oblique, longer and curved, their middle portion being more longitudinal than their ends, and most of these curved veinlets send off at right angles one or two short straight branches to the next veinlet or to the longitudinal vein, thus dividing all the middle portion of the costal area into extremely irregular cells. In the hind wings these veinlets are fewer, about eight in number, and all nearly straight. Along its inner side this longitudinal vein is connected to the rib vein by from three to six oblique and transverse veinlets placed at irregular distances.

The *rib vein* is slightly thicker and more deeply colored than the other veins. Along its inner side are seven short veinlets connecting it to the next vein, the three first of these being oblique and farther apart, the others transverse.

The several veins which ramify the middle and inner portions of the wing, are all branches of two principal veins, which are given off from the inner side of the rib vein near its base. These two veins are designated the externo-medial and the interno-medial. The former extends along the inner side of the rib vein its whole length, the latter along the inner side of the axillary or anal vein. There is a beautiful correspondence between these two veins, both in their branches and their principal connecting veinlets. Each vein sends off three branches, the first branch being also once forked, thus making five veins ending in the margin of the wing.

The *externo-medial vein* parts from the rib vein above and little more than its diameter distant from the root of the interno-medial. It diverges very gradually

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from the rib vein, and after extending the same distance that its root is from the base of the wing it forks, giving off its first branch. This branch, after running a similar distance, divides into two forks, which extend straight onward without any further division to the end of the wing, terminating in the middle of its rounded tip. The main vein extends twice as far before it again divides and sends off its second branch, and at or quite near the same point it makes its first connection with the rib vein, sending a veinlet obliquely backward to it; and this second branch, near its commencement, is connected by a transverse veinlet with the outer fork of the first branch. The main vein, after again extending a similar distance, which is a third or more of its remaining length, gives off its third branch.

Mr. Westwood figures the wings of the left side only, and this externo-medial vein he repsesents as having four branches in the fore wings and three in the hind ones. But both pairs of wings are liable to vary in the number of these branches. In the male specimen before me this vein has only three branches in each of the wings; in the female specimen the fore wing of the left side and the hind wing of the right side have four branches to this vein.

The *interno-medial vein*, like its fellow, forks three times at equal distances apart, sending out branches from its inner side, which ramify the inner half of the wing. The first branch is given off forward of the corresponding branch of the externo-medial, with which it is connected a short distance from its origin by a transverse veinlet which issues from that branch at half the distance from its base to its fork. This branch continues single two-thirds of its length. It then divides, and its two forks attain the end of the wing next to those of the first branch of the externo-medial. The main vein sends off its second and third branches before it has extended half its length. It reaches the inner margin at about three-fourths the distance from the base to the apex of the fore wings and two-thirds of this distance in the hind ones. Like the outer vein, this also sometimes gives off a fourth branch near its termination.

Occupying the long narrow space between the interno-medial vein and the inner margin of the wing are two veins, answering to what are termed the anal and axillary veins. The first of these corresponds somewhat with the rib-vein, it being, particularly in the hind wings, more thick and darker colored than the other veins in this part of the wing, becoming slender and colorless, however, toward its tip; and the interno-medial vein also connects with it by an oblique veinlet at or near the base of its second branch, and by other veinlets beyond this. The second, or axillary vein is slender, colorless, and scarcely half the length of the preceding. Near its base are two short branches, passing from it obliquely to the margin, and these are connected together by a veinlet which runs from near the end of the first to the base of the second branch.

In the fore wings upon the inner margin, near the base, and at the end of the first or shortest of the two branch veins last mentioned, is a singular appendage, a little semi-circular lobe projecting from the margin, like an excrescence growing upon the side of the marginal vein, the vein being straight and not at all indented by it. This appendage is concave on its upper and convex on its lower side, and is feebly translucent except on its thickened edge. It is black in the male, and pale testaceous in the female specimen before me.

The *veinlets* in the wings are more slender than the veins, whitish, gradually becoming more numerous toward the tips of the wings. There are six or seven veinlets between each of the long parallel veins, and one or two less between the veins ending in the inner margin. They are arranged more or less regularly in five or six rows, crossing the wing in an oblique, or partly in a transverse direction.

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REPORTS OF COUNTY SOCIETIES.

ALBANY.

In obedience to the requirement of the statute, ordering a yearly report from the several agricultural societies of the State, I herewith present you a brief abstract of the proceedings of the Albany County Agricultural Society, for the year 1870:

Our annual fair was held at Hurstville, about two miles from the city of Albany, on the 10th, 11th, 12th, 13th and 14th of October.

The week previous was selected for the purpose of holding the fair, but as it set in rainy and unpleasant, it was resolved by a majority of the executive board present at a meeting held on the fair ground, to adjourn for one week.

On the appointed day, the fair opened with a fair prospect of success; but it was then discovered that many exhibitors who had intended to follow up the several fairs taking place about that time, would not be able to attend ours, and then fulfill their previous arrangements.

The manufacturers' department was well represented, excepting the sewing-machines, of which no entries were made by our local agents. The only entry made was by a foreign-agency.

The show of fruit and vegetables, was limited, on account of the adjournment. Most of the articles in this department were perishable, and must necessarily be lost if kept longer than they were prepared for.

The display of cattle was very good, the sheep department fully up to former years, and that of swine and poultry comparing favorably with previous exhibitions.

The show of horses (always good in our county), was not behind former collections. Some two or three stallions, with their get two years old and under, producing a great interest in horse circles, were shown, and formed a very interesting feature in that department.

The premiums being quite large for fast horses, a great number were shown in the different classes, and we were well satisfied that

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the trotting course proves far more beneficial to the owners of the horses, than to the society.

The officers of the society this year, started with the determined purpose of cutting down their expenses, and succeeded very well indeed, and had the receipts been up to former years, would have enjoyed a successful financial year; but such was not the case, as the subjoined statement will show.

Our officers have resolved not to have any debt hanging over the organization, and have about liquidated it.

I would further say, that although our society has not prospered financially as its friends would wish, yet it has been the means of creating in the farming community, a desire to excel, and, we trust that we may yet see some of the true fruits of our labor, and that our society may yet perform the mission for which it was begun.

TREASURER'S REPORT.

Receipts.

Sale of tickets	$1,765 19
Entries	323 60
Stands let on the grounds	254 00
State Treasurer	416 69
Donations	200 00
Subscriptions	1,205 00
J. S. Robbins, late treasurer, and other sources	13 08
Special meeting	13 00
	$4,190 56

Disbursements.

Buildings	$1,980 00
Superintendents, labor, etc	397 50
Printing	433 37
Secretary's office	123 00
Treasurer's office	57 00
Forage	102 69
Premiums	1,097 00
	$4,190 56

The following are the officers for 1871: Henry Callanan, Callanan's Corners, President; D. V. S. Raynsford, New Scotland, Treasurer; Thomas Bagley, Albany, acting Secretary.

THOMAS BAGLEY,
Acting Secretary.

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ALLEGANY.

I have the honor to report that the twenty-sixth annual fair of the Allegany County Agricultural Society was held on the grounds of the society, in the village of Angelica, the 21st and 22d of September, 1870.

The display of domestic manufactures was not as good as usual, but in all other respects the fair was fully equal, if not better, than those held in former years.

The annual address was delivered by J. A. Towner, of Elmira, and was spoken of in terms of the highest commendation by those who heard it.

The receipts during the year were as follows:

Rent of fair grounds	$28 14
Rent of tent	10 00
Received at the gate	312 13
State appropriation	226 69
Received from annual members	254 21
	$831 17

EXPENDITURES.

Fair expenses		$241 00
Printing		45 50
Purses	$197 00	
Premiums	318 00	
		515 00
Miscellaneous		18 06
Cash on hand		11 61
		$831 17

The annual meeting of the society was held on the 14th day of January, 1871, and the following are the officers elected for the year: President, William D. Sausman, West Almond; Secretary, D. P. Richardson, Angelica; Treasurer, G. W. Thomas, Angelica.

D. P. RICHARDSON,
Secretary.

BROOME.

The attendance at the fair was very small, partly owing to the unfavorable state of the weather.

The display of vegetables in agricultural hall was good, what there was of them, but the entries were few.

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There was a small number of good cattle on exhibition, and also a middling display of horses.

But few agricultural implements were entered for premiums, but the display of wagons and sleighs was better than usual.

The fair which closed Wednesday, was not a very successful affair. The receipts of both days amounted only to about three hundred dollars, and the expenses, not including premiums, amounted to nearly that sum. Considering the fact that it was a county fair, the entries were not worth keeping account of.

There were a few good colts entered in classes five and six. There were but a few horses, and most of them were very ordinary animals. W. Haynes had a fine pair of black horses, which took the premiums for the second best single gelding, and best single mare.

The display of cattle was very good, for the number on exhibition. H. F. Brownson had four or five good Devons; Samuel Bayless had on exhibition a number of good grade Durhams, as did also Joseph E. Ely and James Carver. Luther Jennisons' oxen, which took the premium as the best pair of working oxen, weighed 3,050 pounds with the yoke on; and Mr. C. A. Treadwell's oxen, which took the premium as the best broken pair of working oxen, weighed 3,110 pounds without yoke.

The annual address was delivered on Wednesday, the second day of the fair, by Peter W. Hopkins, Esq.

RECEIPTS.

From State Treasurer	$163 31
O. C. Crocker	41 25
annual fair	314 62
sale of old buildings	370 00
Due treasurer—cash advanced	3 91
	$893 09

EXPENDITURES.

For rent of grounds	$250 00
premiums awarded	358 75
other expenses	284 34
	$893 09

The following are the officers for the ensuing year: E. G. Crafts, Binghamton, President; George W. Burbank, Binghamton, Secretary; E. D. Robinson, Binghamton, Treasurer.

GEORGE W. BURBANK, *Secretary.*

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CATTARAUGUS.

Statement of the receipts and expenses of the Cattaraugus County Agricultural Society, for the year ending December 30, 1870.

RECEIPTS.

R. Champlin, for mortgage	$1,000 00
State appropriation	209 50
Life members' tickets	180 00
Members tickets'	441 00
Admission tickets	142 50
	$1,973 00

EXPENDITURES.

Paid premiums	$529 13
Labor and materials for new fair ground	1,813 91
	$2,343 04

The following were elected officers for 1871: John Manley, Little Valley, President; A. T. Palmer, Napoli, Secretary; E. C. Brooks, Little Valley, Treasurer.

A. T. PALMER,
Secretary.

CAYUGA.

The thirtieth annual fair of the Cayuga County Agricultural Society was held on the society's grounds in the city of Auburn, on the 13th, 14th, and 15th days of September, 1870, and was in every respect a successful exhibition of the various agricultural, horticultural, mechanical and domestic products of the county. It has been said, that the interest in agricultural fairs in general, is dying out. However true this statement may be in regard to other counties, we do not find it true in Cayuga. The numbers of entries in the several departments increase with each succeeding year, while the treasurer's books exhibit a gratifying increase in the yearly receipts.

Unusual excellence was observable this year in the display of mechanical and farming implements, while the show of horses and farm stock generally was fully equal to former years.

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Receipts.

On hand as per last report		$413 30
State appropriation		368 06
Loan by A. D. Morgan		200 00
Three quarters rent		187 50
Membership tickets	$560 00	
Single admission tickets	654 92	
Seats	30 60	
Stands	121 50	
Entry fees (trotting)	192 50	
		1,559 52
		$2,728 38

Expenditures.

Premiums	$804 50
Other fair expenses	183 75
Loans, interest and insurance	512 00
Improvements and repairs	480 88
Printing	271 50
Incidental office expenses	156 44
Cash on hand	319 31
	$2,728 38

The following are the officers for 1871: Allen D. Morgan, Auburn, President; John G. Hosmer, Auburn, Secretary; Leonard C. Mann, Auburn, Treasurer.

JOHN G. HOSMER,
Secretary.

CHAUTAUQUA.

In pursuant of a resolution, the thirty-fourth annual fair and cattle show of this society was held October 4th, 5th and 6th, and by reason of unfavorable weather was continued till the 7th of October.

At one o'clock P. M., Oct. 4, the annual election of officers took place at the speaker's stand, and with the following result: Corydon Hitchcock, Jamestown, President; John T. Wilson, Jamestown, Secretary; Alex. M. Lowry, Jamestown, Treasurer.

On motion, Cattaraugus county and adjoining townships in Pennsylvania, were invited to compete for premiums at the next annual fair.

It was also voted to hold the next fair at Jamestown, N. Y.

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Received from sale of tickets	$2,391 75
from subscription	420 00
	$2,811 75

Paid premiums	$1,052 50
L. B. Warner for lumber	400 00
expenses of fitting up ground	524 38
rent and police	304 25
printing and stationery	242 56
sundries	84 96
band	132 00
insurance	19 50
speaker	35 00
Balance on hand	16 60
	$2,811 75

The average yield of winter wheat in the county for 1870, from the best information to be obtained, was about nineteen bushels to the acre. Spring wheat a little less, say seventeen bushels. Corn was more than an average crop. Oats light, really below the average. Grass excellent. In butter and cheese, the principal products of the county, some fine samples were exhibited; but the exhibition was not what we had hoped.

The fair was a success. The first day, October 4th, was quite unfavorable, although the entries kept up until late in the evening. The second day the weather was more favorable, but cloudy, with some rain in the forenoon, but with a fair crowd of people on the ground. The third day was *the day*. The skies were again clear and the streets leading to the grounds were lined with carriages and footmen. The fourth day was all that we could expect, but not equal to the third, financially. The show of Durham stock, was said to be far ahead of any ever before shown at a fair in this county. Gen. B. F. Bruce, of Madison county, who delivered the annual address (which, by the way, was a very fine one), said to me that he had attended a great many county fairs, but never before had he seen so fine a lot of Durham stock at a county fair.

In horses the display was very fair; in sheep and swine it was good, especially in Cotswold sheep. One Cotswold buck, raised in this county by Mr. S. E. Shattuck of Cherry Creek, weighed 400 pounds, and took the first premium at the Ohio State Fair of 1869. The exhibition of domestic manufactured articles was very fine; the

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ladies took great interest in the arrangement of floral hall, which was said to be the finest hall of the kind ever in this part of the State.

JOHN T. WILSON,
Secretary.

CHEMUNG.

In reporting a statement of the transactions of this society for the year 1870, we feel justified in saying, that in no former year has there been so marked and universal interest manifested among the agricultural community in our county as during the last year. Our annual fair was held on the 5th, 6th and 7th days of October, and was generally conceded to be the best we have ever held in the county. The departments of grain, vegetables, fruits, cattle and horses, have seldom been equaled. Our receipts, though not as large as when the attractions of speed in horses were the leading feature, were fair, and enough to pay our debts and leave a surplus in the treasury. The year has been one proving fairly remunerative to the producer. The wheat crop has been about an average one, though not quite as large as last year. The straw grew large, but the long continued dry, hot weather had its effect, so that from the same quantity of straw, we did not get as much grain as last year. The same cause, however, that diminished the quantity of wheat increased that of corn, of which we have had more than an average yield, some crops running as high as 180 bushels of ears per acre. The oat crop was light, generally, although some crops in favored localities were good. Apples were never better, the display of this fruit, as well as that of vegetables, at our fair, has seldom been excelled anywhere. The quantity of butter and cheese, which are among the prominent products of our county, has been quite severely affected by the dry weather, so that although there has been nearly as much manufactured, the quantity per cow is less than last year by at least ten per cent. Of all the instrumentalities for increasing the interest in agriculture, the properly conducted Farmers' Club is the most effectual. We have one that has been organized about a year, and holds its meetings about once in two weeks. At these meetings the farmers themselves occupy the time in conversational discussion, taking in the whole range of farming interests. Our society also holds meetings for the same purpose. The thoughts and suggestions brought out at these meetings are far more practical and useful than

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any number of set speeches or addresses would possibly be. Below I give you a detail of the receipts and expenditures of our society during the year:

RECEIPTS.

State appropriation	$153 56
Paid by committee of citizens of Elmira	281 17
Contributed by members	127 00
Elmira Farmers' Club	10 00
Receipts of annual fair	994 83
	$1,566 56

DISBURSEMENTS.

Paid G. W. Hoffman, superintendent, to pay running expenses of the fair	$575 63
Paid balance due treasurer	48 02
Paid F. M. Wilcox, rent of ground	200 00
Paid old debts for lumber and materials for constructing buildings on fair grounds, etc.	263 76
Paid on premium list of 1870	198 50
Balance in treasury	280 65
	$1,566 56

The following are the officers elected for the ensuing year: Edmund Miller, Elmira, President; Dewitt C. Curtis, Horseheads, Secretary; W. T. Post, Elmira, Treasurer.

DEWITT C. CURTIS,
Secretary.

CHENANGO.

The twenty-fifth annual fair of the Chenango County Agricultural Society was held upon the new grounds in the village of Norwich, on Tuesday, Wednesday and Thursday, Oct. 4, 5 and 6, 1870. The first day was devoted to making entries and arranging stock upon the grounds and articles in floral hall. The number of entries was larger than in 1869.

The stock was very nice, but not so large a variety as had been on exhibition in some past years. The number of entries of mechanical articles was unusually large. Floral hall was well filled. Many nice articles, made by hand, showed that the ladies of Chenango have not failed to make improvements with the needle. Also some very fine machine work.

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In vegetables the show was good, nearly all kinds being on exhibition, even to sweet potatoes, grown in the Unadilla valley.

Mr. M. M. Pomeroy delivered the address on the second day, and without doubt more people visited Norwich on that day than ever before, making, financially, our fair a success.

We have had a very dry season. The drought commenced very early. The spring was warm and dry with no frosts after April 15, and we might have planted our corn then with safety. Grass was early and got a fair growth by the 10th of June, but did not grow much after that. Farmers commenced cutting in June, and a great many finished by the 10th of July. The crop was one-third less than we usually get, but quality good. Corn, a good crop, except gravelly soil, that being injured by the drought. Oats that were sown early were good, but straw light, the yield being up to former years; present price sixty cents. Potatoes, a good crop, but matured early, and decayed after put in cellar. Wheat, not much raised, but good what there was. Rye good. Buckwheat light, but quality fine, for we had no early frosts. Straw light.

Chenango county is not a grain growing section, for we can buy our grain cheaper than we can raise it. Dairying is the principal business of our farmers, and I sometimes think they are trying to see which can keep the greatest number of cows instead of which can keep the best. The season continued dry until September. Then occasionally a shower, not enough to affect the streams, many farmers driving their stock two or three miles to water. It commenced raining Sunday night, Dec. 11, and continued until Dec. 13. The springs and streams have filled for the first time since April. I am told by the old residents of this county, that they never witnessed such a drought. Farmers have improved the fine weather and done all their plowing, and many jobs that could not be done ordinary seasons.

Receipts.

Balance on hand at date of last report	$430 83
Annual members	760 00
Single tickets	573 75
Trotting	54 00
All other sources	38 00
Amount received from State	297 38
	$2,153 96

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EXPENDITURES.

Premiums paid	$686 50
Paid speaker	150 00
band	40 00
rents	165 00
printing	86 50
feed	39 25
labor and expenses of fair	241 78
expenses moving and repairing buildings	468 72
salaries of secretary and treasurer	50 00
Balance on hand	226 61
	2,153 96

Officers elected for 1871: N. O. Wood, Sherburne, President; R. A. Young, Norwich, Secretary; C. R. Frink, Norwich, Treasurer.

R. A. YOUNG,
Secretary.

CLINTON.

At the annual meeting of this society, held January 28th, 1870, it was determined to make a strong effort to secure permanent grounds and buildings for the use of the society. The executive committee finally effected a lease of Mr. John H. Sanborn's "Cumberland Park," a piece of land lying west of this village, containing about fifteen acres of ground, on which is a fine half-mile track. This property was leased for the term of twenty years. A subscription paper was at once circulated, and about $800 subscribed and paid in by citizens of Plattsburgh. With this amount and $300 balance from last year, and about $200 received from the State (in all about $1,300), the executive committee began the erection of suitable buildings for exhibition purposes.

Three buildings were erected: A floral and mechanics' hall, two hundred by thirty feet; a mess or dining hall, eighty by twenty feet; and an office for the use of the officers of the society, about twenty feet square. These are well built and painted structures, sufficient for the wants of the society for many years to come. Their total cost was $2,760.

The annual fair opened October 4th. Weather rainy, disagreeable and blue. Entries came in slowly, and at night it was determined to take entries during the second day of the fair. At the end of the second day the entries numbered 685, being nearly as many as the

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preceding year. The third and fourth days were very pleasant, and the grounds were well filled with visitors. A very able address was delivered by Hon. D. S. McMasters.

Taking the year's transactions as a whole, it has been a most successful one, and after putting everything in shape, the society owe but $800, which will no doubt be paid before another report goes forward from the society.

Receipts.

Cash on hand from last report	$306 68
State appropriation	204 75
Subscribed by citizens of Plattsburgh	783 10
Interest on loan	16 30
Premiums donated	242 50
Membership tickets and other sources	1,672 90
	$3,226 23

Expenditures.

Permanent improvements, including rent of grounds	$2,001 94
Expenses of annual fair	239 91
Premiums ($225 trotting)	829 00
Incidental and office expenses	48 74
Stationery	11 97
Insurance	20 00
Printing	74 67
	$3,226 63

At the annual meeting, held January 25th, 1871, the following officers were elected for the current year: President, Jehiel B. White, Peru; Secretary, John B. Trudo, Plattsburgh; Treasurer, Benjamin D. Clapp, Plattsburgh.

R. BAILEY, *Secretary.*

COLUMBIA.

The undersigned, Secretary of the Columbia County Agricultural Society, would respectfully report that the annual fair of the society was held on the 13th, 14th, 15th and 16th of September 1870, on the society's grounds, Chatham Four Corners, and was, in all respects, a complete success. The show of live stock was extra good, and the spacious building of the society was well filled with the agricultural products of the county, and with specimens of mechanical skill of rare excellence.

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RECEIPTS.

Amount on hand last report	$1,002 27
State appropriation	324 19
Receipts from all other sources	4,121 00
	$5,447 46

EXPENDITURES.

Amount paid on debt, principal and interest	$771 00
Premiums paid and other expenses	3,054 95
Leaving balance in treasury of	1,621 51
	$5,447 46

Officers for the year ending January 1, 1872: Andrew Boright, President, Chatham Village; Joseph B. Hogeboom, Secretary, Chatham Village; H. D. Simpson, Treasurer, Chatham Village.

H. MILTON FORD,
Secretary.

CORTLAND.

The following are the officers elected for the current year: H. Denison, President, Homer; C. O. Newton, Secretary, Homer; S. McC. Barber, Treasurer, Homer.

RECEIPTS.

On hand from last year's account	$1,855 65
June exhibition	755 49
September (annual) exhibition	578 26
Ground rent	20 00
Four life members	40 00
	$3,249 40

DISBURSEMENTS.

Erection of building	$958 81
Premiums and expenses June exhibition	561 65
Premiums September exhibition	506 00
Printing and expenses of exhibitions	143 91
Cash on hand	1,079 03
	$3,249 40

J. C. CARMICHAEL,
Secretary,

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DELAWARE.

The thirtieth annual fair was held at Walton, September 14th, 15th and 16th, 1870. The exhibition was all that could have been anticipated, every department was represented.

There were on exhibition 151 head of cattle. Mr. Edwin Shaw, of Hamden, exhibited some full blood Alderney cattle, which were much admired. Mr. P. G. Northrup, of Franklin, exhibited Ayrshire stock which are becoming favorites with our dairymen. There were a goodly number of Devons, full blood and grades. The sheep and hog departments were well sustained. There were fifty-five horses and colts on exhibition, We think there is a decided improvement in the quality of stock in our county.

We have had a boys' department for some years. This year it was a grand success, more than 100 entries in fruit and vegetables. They were ahead of many county fairs.

The ladies' department, last but not least, was a decided success. Much praise is due to the ladies of Walton, for their skill in making their hall so attractive.

The citizens of Walton are justly entitled to the thanks of the society for their efficient aid.

The annual address was delivered by Mr. G. W. Hanford, of Deposit. It contained much valuable instruction to the farmer.

The annual meeting for the election of officers, and to award premiums on field crops, fruits, dressed meats, etc., was held at Walton, January 4th, 1871.

The following officers were elected: President, George D. Wheeler, Deposit; Treasurer, George W. Hanford, Deposit; Secretary, Porter Frisbee, Delhi.

Receipts.

Balance on hand at date of last report	$405 08
Winter meeting memberships	4 00
Received memberships at fair	569 00
From sale of tickets	369 65
For rent of grounds	50 00
State appropriation	258 38
	$1,656 11

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DISBURSEMENTS.

Winter meeting	$58 00
Expenses of former years	9 90
Men's premiums	565 25
Ladies' premiums	217 50
Boys' premiums	56 75
Expenses of society	304 18
Balance on hand	444 53
	$1,656 11

PORTER FRISBEE,
Secretary.

DUTCHESS.

In making a brief report of the transactions of this society, it is a pleasure to say that it has had, in most respects, a successful year. The very serious drought that set in in the month of June, and continued through the season, injured, greatly, the growing crops, and, as a consequence, many kinds of stock were not in condition to show to advantage at our annual exhibition. The hot weather, the scarcity of water and dusty condition of the roads also had their effects, but the exhibition and the attendance were such that, as a whole, the fair for the year can be safely set down as eminently successful and satisfactory in almost all respects. The society's exhibition was held at their grounds, Washington Hollow, on the 13th, 14th, 15th and 16th days of September. In referring to some of its most prominent features, it would appear that it differed in some respects from those of former years. Sometimes the complaint has been, "too much horse," and the facts would seem to prove it true that he did receive more attention than he was justly entitled to from those whose only object should be to promote the best interests of agriculture; but this year such complaints could not, with so much propriety, be made. The show, although deficient in the glitter and excitement attendant upon the exhibition of large numbers of fine horses, and trials of speed, was not without some very superior animals. Considerable attention is now given to raising fast going horses, and some young animals of a superior order were on exhibition. The Hambletonian and Ethan Allen stock seem to be taking the lead, each having their strong friends. The scanty pastures told seriously upon the cattle department, but there was a fair exhibition as to numbers, quality and condition. The leading exhibitors of short horns were Mr. Daniel B.

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Haight and Mr. Robert G. Coffin. The animals shown by them were of a superior order. There were but few of other breeds of thorough bred cattle on exhibition. In the classes of native, grade, working and fat cattle, the contribution from the herd of Mr. Geo. Ayrault held their usual prominent position. This gentleman had on exhibition about forty head, all worthy of the prizes for which they competed, and many of which they won. The exhibition of swine and sheep was not great as to numbers, but good as to quality. In the class of large breeds of swine, Mr. J. D. Coleman had Chesters; and in the class of small breeds, Mr. Daniel B. Haight had Berkshires. The specimens shown by both these gentlemen were of decided merit. Of long wooled sheep, Mr. Ayrault and Mr. George Vail were the principal exhibitors. In middle wools, the competition was mainly between Mr. D. B. Haight and Mr. Ayrault, and the prizes were about equally divided between them. Mr. S. T. Angel had a pen of ewes of decided excellence. In the class of Silesian merinos, Mr. William Chamberlain bore away all the prizes. It would have been more satisfactory to the managers of the society, and to visitors generally, had there been more competition in this class, yet the prizes were cheerfully awarded, as the animals shown from the well known flock of the exhibitor were such as to well merit all that the society could do for them. In the class of cross blood and common sheep, the name of Mr. Ayrault appears as the recipient of many first prizes, and in fat sheep, all of them. A new feature for the year was a large and fine display of poultry. In former years this branch of the show has been quite meagre. This came in part from inattention, but principally from want of conveniences for its display. During the summer, a handsome and convenient building had been erected for this purpose, containing one hundred and fifty coops, nearly all were filled with fine specimens of the feathered tribe. The leading exhibitors were Mr. J. R. Stuyvesant of Poughkeepsie, Mr. D. C. Noxon of Beekman, Mr. Peter H. Cristie of Union Vale, and Mr. D. B. Haight of Washington. The number of fowls on exhibition, and the conveniences for showing them, made a fine appearance, and were objects of much attention. No branch of our exhibitions, for several years, has given more general satisfaction than that of its farm implements, not that it excels many other county society exhibitions, but when it is known that almost every implement is drawn by wagon over twelve miles of common road, it must be conceded that the shows, under the circumstances, have been good indeed. The society is under many obligations to the citizens of Poughkeepsie, who have

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contributed so largely to this department. The exhibition of implements has this year excelled that of any former year, and it is deemed proper to name the well known firms of Uhl & Husted, and Trowbridge & Co., as being the principal contributors to this very useful and interesting department of an agricultural exhibition. Certainly no objection has been or can be made to any reasonable amount of encouragement that could be given to this branch, and it is gratifying to record that the efforts made in its behalf have met with such decided success.

Another department of industry that has received much attention of late years, and must receive the approval of all, is the cultivation of fine fruit. Good fruit has always been regarded as a luxury, allowable to all that could obtain it, but it is only within a very few years that the choice and improved kinds have been within the reach of the great mass of our people. It cannot be said that this is a fruit-growing county for market purposes, but the rich display of tempting specimens with which the tables were loaded at our late fair may give a fair estimate of the attention its cultivation receives. Apples do no better than in years gone by, but many new and superior varieties have been added to the list. Pears, of almost all varieties, do well, and grapes of the many different kinds may be had in abundance, by a little care in summer and a little protection in winter. The season proved highly favorable to the perfecting of most kinds of fruit, and its growers brought out their fine specimens in abundance, making a display far ahead of any former year. In this department it is but justice to add that our friends from Poughkeepsie contributed largely, and bore away many of the prizes. The display of flowers and plants growing in pots, arranged in boquets and in elaborate floral ornaments, excelled that of any previous exhibition of the Society. The entries were very numerous and the competition close. That those contributions of the skill, taste and industry of our lady friends received many and constant marks of attention, it will be unnecessary to add. The many fine specimens of needle and other kinds of useful and fancy work, the paintings, drawings, the profusion of canned and preserved fruit, and many other works of their hands, with which every available space was filled, proved their willingness to contribute their share to the success of such an exhibition. The merchants and mechanics, from Poughkeepsie and smaller villages, brought from their stores and their workshops specimens of their richest goods and mechanical skill, to aid in the general success and beauty of the show.

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The display of garden vegetables, though not in itself so attractive to many as some other parts of the show, was larger than usual, and better as to the specimens shown. It may be said that, as a whole, the exhibition was satisfactory; yet to the extreme dry weather, the clouds of dust and scarcity of water, and not to any want of good will on the part of our people, may be attributed its failure to be what its managers hoped for.

Receipts from all sources except State money (about $600 less than the previous year)	$5,423 74
Disbursements, including premiums	5,236 97
Balance in treasury	$186 77

Officers for 1871: John W. Storm, President, Lagrangeville; Thos. W. Jaycox, Treasurer, Wappinger's Falls; Geo. Sweet, Secretary, Washington Hollow.

GEO. SWEET, *Secretary.*

ERIE.

Receipts.

Balance on hand January, 1870		$361 61
Letting stands at the fair	$101 00	
Trotting entrance fees	53 00	
Sale of tickets	880 95	
		1,034 95
State appropriation		453 39
		$1,849 95

Expenditures.

Premiums	$679 50
Trotting premiums	163 50
Fair expenses	319 60
Printing	65 75
Incidental expenses	22 00
Speaker	50 00
Loan	144 08
Cash on hand	405 52
	$1,849 95

Officers elected for the year are: President, P. W. Powers, Hamburgh; Secretary, R. C. Titus, Hamburgh; Treasurer, Robert B. Foote, Hamburgh.

R. C. TITUS, *Secretary.*

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ESSEX.

The twenty-first annual fair was held on the society's grounds, at Westport, September 27th, 28th and 29th. The weather was fine; the attendance large, almost every town in the county being well represented. The whole number of entries made was about 400, which shows a little increase over last year. The number of entries of cattle was small, but some were very good specimens. There was a splendid show of matched and carriage horses. The display of fruit and vegetables was excellent, and shows the increased interest manifested by our farmers in that direction. Many articles of domestic industry were on exhibition, which were worthy of special notice. Floral hall was beautifully decorated and well filled with flowers, specimens of ornamental and needle-work, etc., giving evidence that the ladies are always ready to contribute liberally toward making our fairs pleasant and attractive. On the whole, I am glad to inform you that our last fair was a decided success, and augurs well for the future of our society.

The annual meeting was held at the hotel of William Richards, in Westport, February 2d. The following officers were elected for the present year: Jonathan Mather, of Essex, President; E. B. Low, of Westport, Treasurer; B. B. Richards, of Westport, Secretary. The time fixed upon for the next annual fair, September 26th, 27th and 28th.

Cash on hand January 1, 1870	$96 51
State appropriation	173 06
Amount received at annual fair	1,056 33
	$1,325 90

DISBURSEMENTS.

Premiums and purses	$672 40
Repairs, gate-keepers and police	125 25
Rents of grounds	125 00
Balance on hand January 1, 1871	403 25
	$1,325 90

B. B. RICHARDS,
Secretary.

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FRANKLIN.

I have to submit the following annual report of the Franklin County Agricultural Society for the year just closed:

The nineteenth annual fair of the society was held on the society's grounds, at Malone, on the 27th, 28th and 29th days of September last. The attendance was unusually large. The number of entries made, amount of premiums awarded and gross receipts were in excess of any previous year.

The exhibition of thoroughbred stock for the last few years has been steadily improving, and is the result of the liberal premiums offered for this class of stock. The society has not yet secured the introduction of thoroughbred horses into the county, though a premium of seventy-five dollars was offered at the last fair for this class of stock. Yet the exhibition of stallions, matched and single geldings, brood mares and colts, was very fine and creditable to the county. The exhibition of sheep was very good, though not large. The exhibition of swine was also very fine, and embraced the choicest breeds. Our exhibitions of poultry are annually improving, and each year witnesses some new fancy varieties at our fairs.

The exhibition of butter and cheese was large, but the quality, in our opinion, was not as good as in former years, owing to the dryness of the season and want of richness in the feed, and not the result of any lack of skill in the manufacture.

The exhibition of fruit was large and very fine, and shows an increasing interest in this department of agriculture. Nearly all the new and choice varieties have been introduced, and are being raised in the county. In the mechanical department there was a fine display, especially in the class of miscellaneous manufactures, and the list of discretionary premiums awarded in this class was larger than the regular list. The display of farming implements proper was very good, though not large.

As a whole, the general exhibition was good, creditable to the county, and a source of gratification to all who are interested in the objects sought to be promoted by the organization of agricultural societies.

The address, delivered by Hon. Thomas G. Alvord, was one of marked ability, and was attentively listened to.

The gross receipts from the fair were.....	$3,850 50
The number of entries was 842.	
The amount of premiums awarded was.....	971 00

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The total expenditure of the society for the year was....		$5,179 74
Which included the sum of $2,100.65 for permanent improvements, to wit:		
For purchase of land.....	$459 18	
Erection of a dining-hall, treasurer's and secretary's office.....	1,641 47	
		$2,100 65

The past season was not one of success to the farmers of this county. The grass and grain crops were very light, especially the late grains, which were almost a failure. The early root crop was fair. The hop crop was very good as to quality, though there was a falling off in quantity.

The following is a statement of the financial standing of the society, as appears by the report of the treasurer made to the last annual meeting:

RECEIPTS.

Cash on hand at last report.....	$1,307 29
Interest.....	72 56
Rents received during summer.....	23 00
Lumber sold.....	3 75
Reimbursed by county for expenses.....	9 00
Receipts during fair.....	3,850 50
From State.....	121 87
	$5,387 97

DISBURSEMENTS.

Purchase of land and interest on same.....	$459 18
Dining hall, treasurer and secretary's office.....	1,641 47
Paid building committee.....	50 00
Balance of premiums of 1869.....	13 00
Premiums of 1870 paid.....	964 00
Repairing track and grounds.....	520 97
Music during fair.....	100 00
Help during fair.....	270 00
Dinners of officers, judges, etc., during fair.....	89 00
Trotting purses.....	650 00
Address at fair.....	40 00
Printing.....	165 70
Insurance premium.....	19 50
Water tax.....	25 00
Treasurer's salary.....	50 00
Secretary's salary.....	50 00
Incidental expenses.....	71 92
Balance in hands of treasurer.....	208 23
	$5,387 97

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The following officers were elected for the year 1871, at the annual meeting, held January 12th, 1871: James C. Drake, Malone, President; Michael S. Mallon, Malone, Treasurer; Sylvester S. Willard, Malone, Secretary.

S. S. WILLARD,
Secretary.

FULTON.

I beg leave to report that the Fulton County Agricultural Society held their annual fair on the 13th and 14th days of September, 1870, and that we had a good display of horses and cattle, a few sheep and hogs, a good display of poultry, and in the ladies' department the display was middling; one or two lots of cheese and butter. Of grain there was none offered for premiums, and all I can say in regard to the various crops and produce is what I have heard the farmers say. The crop of corn and grain was good. We have raised money this year, since July 1st, 1870, to pay off our indebtedness on our fair ground, which you will see under its appropriate head.

Receipts.

For entries at fair by exhibitors	$78 50
For entrance fees on both days of fair	570 55
For rent of ground during the fair	30 00
For rent of fair grounds during the year	115 00
To pay off the debt on ground belonging to association	1,952 50
Due from State and from life members	380 95
	$3,127 50

Expenditures.

For premiums	$369 50
For indebtedness on grounds	2,164 30
Other expenses for 1870	211 23
Amount on hand 1871	382 47
	$3,127 50

The officers of the society for the ensuing year are: Jacob Boshart, President, Johnstown; John J. Davidson, Secretary, Johnstown; Nathan P. Wells, Treasurer, Johnstown.

JOHN J. DAVIDSON,
Secretary.

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GENESEE.

This society is in a highly prosperous condition. They have held during the year 1870, two exhibitions, namely, July 4th, a horse show and fair, and the annual cattle show and fair, September 19th and 20th.

The horse show and fair, July 4th, was a success. The weather was pleasant, there was a large attendance, and everything passed off satisfactorily.

The annual fair, held September 19th and 20th was well attended, the weather fine, and altogether, gave as general satisfaction as any fair ever held in this county.

The following is a statement of the financial condition of the Society:

RECEIPTS.

Balance from 1869	$202 40
Received from State Treasurer	224 25
Receipts July 4th	1,223 19
Receipts September 19th and 20th	2,503 11
	$4,152 95

DISBURSEMENTS.

Expenses and repairs, July 4th	$531 33
Premiums paid, July 4th	537 50
Expenses and repairs, September	748 33
Premiums	1,591 50
Balance on hand	744 29
	$4,152 95

And no demands exist against the society.

Officers elected for the current year: George Burt, Batavia, President; L. R. Bailey, Batavia, Secretary; A. N. Condin, Batavia, Treasurer.

L. R. BAILEY,
Secretary.

GREENE.

When our last report was made, we were without any suitable place to hold our annual fairs. Since then we have waked up; have leased a field of thirteen acres for ten years. It is favorably located, is

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substantially inclosed, and has one of the best half mile tracks in the State.

Through the liberality of the friends of our society, we have erected a fine hall 60 by 30, at a cost of $800, three-fourths of which has been paid, and we hope to have the whole canceled before our next fair, without drawing on the funds of the society.

Our fair was appointed for the last day of September and the first day of October. The first day was a success in almost everything connected with the fair. The weather was favorable, the attendance nearly double our usual number, and the entries in horses, cattle, swine, dairy products, fruits, and such articles as are usually exhibited at our fairs, ranged from 25 to 100 per cent greater than at any previous fair of the society. Our hall was "more than full." The sanguine anticipations of our officers, who had labored so hard to make this one of the best fairs ever held in this county, were somewhat damped on the second day, for it proved to be one of the "very rainy ones;" consequently we adjourned for five days, at which time we again met, and fully carried out our programme, and listened to an eloquent and instructive address by Wm. Fiero, Esq., of Missouri.

The interest in our society appears to be increasing, our meetings are more largely attended, and there is an evident determination on the part of the officers to make it worthy the attention of the farmers of the county. We anticipate enlarging and making our premium list more attractive, hoping to increase the number of exhibitors and their friends.

Much of the prosperity of our society is due to the deep interest manifested, and activity and energy displayed by our president, Hon. Joshua Fiero, Jr., of Catskill.

Officers elected for 1871: President, Hon. Joshua Fiero, Jr., Catskill; Secretary, George W. Russ, Acra; Treasurer, Thomas B. Holcomb, South Cairo.

FINANCIAL REPORT.

Receipts.

Balance on hand from last year	$76 05
Life members	30 00
Annual members	255 00
Ticket office	447 90
Rent of stands	110 50
Money borrowed in anticipation of State appropriation	98 01
	$1,017 46

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Disbursements.

Premiums	$456 50
Printing	67 00
Rent for fair ground	200 00
Band	125 00
Secretary's salary	40 00
Incidental expenses	128 96
	$1,017 46

GEORGE W. RUSS,
Secretary.

HERKIMER.

The annual meeting of the society was held at Herkimer, on the second Saturday in January, and was but slimly attended, on account of the bad condition of the roads.

In the election of officers, a great deal of unnecessary bad feeling was exhibited by the partisans of the respective candidates for president, and the interests of the society much injured thereby.

The following officers were elected for the year 1871: President, J. H. Bellinger, Herkimer; Secretary, Morris Fikes, Herkimer; Treasurer, J. Henry Crim, Mohawk.

The treasurer's report showed the following as the financial condition of the society:

RECEIPTS.

Former treasurer	$643 72
Tickets sold and entries made	2,711 78
Rents for ground, etc	721 00
State appropriation	273 00
Interest on securities held	13 04
Former treasurer	100 00
	$4,462 54

DISBURSEMENTS.

Premiums paid	$1,725 00
Rent of grounds	170 00
Band	105 00
Police	522 80
Bill of 1868 unpaid at time	23 65
Bill of 1869 unpaid at time	9 00
Carried forward	$2,555 45

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Brought forward	$2,555 45
Unpaid premiums of 1867	7 00
Unpaid premiums of 1869	18 00
Work on ground, dinner tickets, trotting match, salaries of officers, repairs to buildings, fences, etc	1,023 99
Cash on hand	858 10
	$4,462 54

H. CLAY HALL,
Secretary.

JEFFERSON.

The fifty-third annual fair of the Jefferson County Agricultural Society was held on the society's grounds, in the city of Watertown, September 7, 8 and 9, 1870.

The people of the county, as well as the press, urged upon the board of managers the necessity of a thorough revision of our premium list. The board, in concert with that wish, heartily responded to the wishes of the people, and not only revised, but enlarged very extensively, even doubled and trebled, in some of the departments, the premiums heretofore offered by the society, thereby enlisting nearly every class of exhibitors within the limits of our county. Then to further attract the attention of the farmers to the improvements in other localities, the managers opened the four departments, namely, horses, cattle, sheep and swine to the world. The result was in every respect satisfactory. The competition was large, spirited, and of unusual interest to the farmer, bringing, as it did, some of the very choicest Canadian horses and sheep to our exhibition; teaching us we did not possess all the prize animals in the world. Not only from Canada did we have exhibitors, but from a large number of the counties of this State, making the fair extensive, interesting and profitable to the farmers of Jefferson. The attendance on the first day was estimated at 5,000 persons. The weather was auspicious, though the earth was thirsting for rain, which rendered it disagreeable under foot; still the motto of all seemed to be excelsior. At the close of the first or working day of the fair, our entries exceeded sixteen hundred, several hundred more than the sum of entries at any former fair. We anticipated this and opened our entry books several days prior to the opening of the exhibition, and saved ourselves the confusion and rush of business attendant on such occasions. The second day was emphatically *the* day of the fair. Com-

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petent judges estimated that from twelve to fifteen thousand people were on the grounds. The judges were at work early in the morning, and long before noon of that day, the various halls were so crowded that the judges could not proceed with their examinations without aid from the officers of the society. The large domestic hall, which, by the by, has been remodeled this season (by adding a gallery twelve feet high and ten wide to the three sides of the building for the display of domestic goods, etc., etc.), was crowded to its utmost capacity with the choicest of ladies manufacture. Never did the ladies achieve a greater triumph or contribute more to please the eye and taste than in the display of goods, ornamental, fanciful, useful and attractive. The entries in this department were more than double any former year. In floral hall the display was beyond our most sanguine expectations. The amateur and florist, notwithstanding the extreme drought of the past season, filled it in every nook and part. Fruits of the choicest kinds, flowers of the richest hue, occupied the entire space on the sides of the building; while in the centre of the room Dr. Trowbridge, the great taxidermist, exhibited his collection of wild animals and stuffed birds. This hall was a very attractive feature of the fair. Dairy hall was well supplied with choice vegetables from the garden as well as from the field, showing a superior collection, though the drought may have stunted some varieties, yet the show was very creditable to the farmers of Jefferson. In butter and cheese the samples shown were double any former year, and yet the improvement was not as great as we could desire. The drought affected nearly all our early made cheese, or its effects came from the grasses. Manufacturers of cheese uniformly asserted that the cause of strong or rank flavored cheese was owing, in a great measure, to the dry condition of our pasturage. Later in the season, after the showers became more frequent, this defect was overcome.

Mechanics' hall was fully occupied, also the space outside the building allotted to farm machinery and farm implements. I contend we cannot do justice to our society, or to the exhibitor, unless we set apart a day or two previous to our fair, to test, by trial, farm implements and farm machinery. The State society has properly opened the way in this respect, and I trust we shall have practical results therefrom. Our county takes great pride in the excellent horses she furnishes for the market—the road as well as the farm. The large number on show this year, was in advance of any previous one; indeed it would be too voluminous in this report to particularise in this department. Still, it cannot be denied, that this department

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monopolizes a great share of the attention of visitors and exhibitors, so much so, that it is the all absorbing topic when horses for speed come upon the track. Some doubt the propriety of testing stallions and roadsters at all at our exhibitions; but the masses usually approve of such, otherwise it would not be in vogue.

In the cattle department, the thoroughbred stock was fully represented from every herd in the county. The advance in the premium list, awakened a new interest in this class, and brought them out in full force, though the stock did not, in point of sleekness, show that peculiar fineness of coat characteristic of the Ayrshire, etc., still those on exhibition reflected great credit on the owners.

There was a very superior show of sheep. One breeder from Canada exhibited seven, most of them imported from Scotland last year. Good judges pronounce them far in advance of any ever shown in this State. As an evidence of their appreciation, several farmers have imported from this gentleman's flock, some of his choice Cotswold and Southdown ewes and bucks. In swine, Jefferson county claims the palm. We had on exhibition 113 hogs of the different breeds, but what is known as the "Jefferson county breed" leads the van. Of fowls, we had a limited show, though good for a county exhibition.

Pisciculture, or fish farming, was represented in its most practical form. Messrs. Huntington and Woodruff had on exhibition (in a fountain prepared expressly by the society), several hundred of the finny tribe. It would have been the most attractive novelty on our show grounds, but for the dust clouding the water in the fountain. Whether it will be remunerative to propagate trout artificially, is yet a mooted question. This year, the proprietors claim a decided improvement in the manner of obtaining the spawn or eggs. They put down artificial screens over the spawning beds, removing them two or three times each week, thereby securing a healthier, stronger spawn, and, at the same time, results favorable to the per centage of eggs that hatch, but the great secret yet to learn, is to rear the fish or trout, after feeding time commences. When that is settled, we shall know more about the art than we do to-day.

It is a pleasure to state, that no occurrence interfered to mar the pleasure of the fifty-third annual fair, and thus the entire exhibition was gratifying to the great crowd of visitors, and satisfactory to the officers and board of managers of the society; and as the weather proved favorable, with the exception of an hour or two before the close on the last day, we can truly assert, that the fair of 1870 was a great success.

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I should have stated in the proceedings of the second day, that Governor Hoffman and staff, Colonel Flower and the Thirty-fifth regiment were on the fair grounds. Governor Hoffman reviewed the regiment, made a speech to the soldiers and citizens, and then, by invitation of our president, General T. R. Pratt, repaired to the speaker's hall. General Pratt then delivered the annual address, touching upon the early history of Jefferson county, together with the tragical Whittlesey affair in the war of 1812. Passing over the historical, he came home in his address to the farmers of to-day. His suggestions were practical, lucid and entertaining. Governor Hoffman being called out, thanked the numerous assemblage for the compliment, and advised all farmers and farmers' sons, to stand fast to their calling, adorning their profession with candor, honesty, frugality and upright citizenship.

The various crops of this county suffered extremely by the drought during the months of June and July. The grass crop probably was lessened on the north side of Black river nearly, if not quite, one-half, while on the south, on more undulating land, it may have fallen short one-third; and yet in some localities, with an improved culture and care, individuals realised nearly a full harvest. Corn was more than an average crop, while wheat, barley, oats and peas fell short full one-third in the county.

In addition to the foregoing perhaps, I should state that our society has built a new and commodious dininghall on their grounds during the summer, besides other necessary repairs, amounting, in the aggregate, to upward of $3,000. In order to swell the premium list to $5,000, citizens of the county subscribed and paid in upward of $600; and in consequence of the great outlay on the society's grounds, for building and repairs, and the heavy premium list, the society stands in debt several hundred dollars.

RECEIPTS.

Amount received from late treasurer	$2,123 72
State appropriation	446 06
Membership tickets	1,954 00
Single and carriage tickets	2,096 54
Shows, etc.	206 10
Rent of dining hall	100 00
Rye grown upon grounds	50 00
All other sources	30 20
	$7,006 62

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EXPENDITURES.

Buildings, repairs, etc.	$2,357 85
Printing	283 80
Harvesting and threshing rye	38 00
Salaries, stationery and postage	221 82
Expenses of the fair	963 75
Premiums	2,962 00
Cash on hand	179 40
	$7,006 62

The officers for 1871 are, Simeon Mather, President, Bellville; A. P. Sigourney, Secretary, Watertown; Willard Ives, Treasurer, Watertown.

L. D. OLNEY,
Secretary.

LEWIS.

The society offered the past year larger premiums, and more of them, than formerly. One reason for so doing was that the Lowville people, early in the season, began to talk up the town fair at Lowville. The town fair was held at Lowville one week after the county fair.

We have held our fairs at Turin and Lowville, alternately; for that reason, it does not keep up the interest that it would if the fair was located either at Turin or Lowville. At either location, if the grounds were to be occupied every year, the society would have far more and better conveniences. The annual fair was held the 14th, 15th, and 16th September. In previous years, the last day the greatest number attended, and receipts would be fully up to the first day. Early in the morning it commenced raining and our receipts were less than fifteen dollars. The number of entries of stock and cattle was large. The people living in the north part of the county had some doubt in their minds about the growth of vegetables in Lewis county, the north part of the county being dry. Long will it be remembered by some who will have to purchase hay the coming winter.

RECEIPTS.

Cash on hand	$986 90
Interest on loan of $800	40 00
Tickets sold	679 00
Other sources	51 00
	$1,756 90

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EXPENDITURES.

Premiums, police, rent of grounds, etc.,	$1,028 57
Balance on hand January 15th, 1871	728 33
	$1,756 90

Officers for 1871: Alexander B. Gebbie, President, Lowville; F. B. Morse, Secretary, Lowville; C. G. Riggs, Treasurer, Lowville.

LEYDEN CHEESE FACTORY ASSOCIATION.

The number of pounds milk received at factory from April 19th, 1870, to November 1st, 1870, from 370 cows. The number pounds green and cured cheese made; also showing quantity of milk for a pound of green cheese made during the season, etc.

Number pounds milk received at factory	1,069,659
Number pounds green cheese made	114,609
Number pounds cured cheese sold	107,733
Number pounds shrinkage	6,876

9.33 pounds milk for one pound green cheese.

9.92 pounds milk for one pound cured cheese sold.

Average price received per 100 pounds cheese sold, $13.42.

For April	it took	9.76	pounds milk	for one pound cheese.
May	"	9.39	"	"
June	"	9.30	"	"
July	"	9.60	"	"
Aug.	"	9.75	"	"
Sept.	"	9.12	"	"
Oct.	"	8.62	"	"

F. B. MORSE,
Secretary.

LIVINGSTON.

At the annual meeting of the society, held at Geneseo on the 4th day of January, 1870, the following officers were duly elected for the ensuing year: President, Aaron Barber; Secretary, Wm. A. Brodie; Treasurer, Kidder M. Scott.

At the same meeting there was voted to be paid from the funds in the treasury the sum of five hundred dollars to Thomas C. Chase, Sheriff of Livingston county, and at that time acting as marshal on the grounds, to partly reimburse him for damages sustained in a suit at law, growing out of the arrest of a person charged with disorderly

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conduct on the grounds during the annual fair of 1866. Before the treasurer had paid such amount an injunction was procured and served upon the officers of the society enjoining them from the payment of such sum, or any part thereof. At a subsequent meeting of the board of managers held for action on this matter, the following action was taken: A committee was appointed to confer with Mr. Chase, and to inform him that unless he would furnish the society with a bond of indemnity, against any costs which might accrue against the society in consequence of the action commenced, the society would not defend. This Mr. Chase declined doing, which had the effect of closing a vexed and serious question; in fact, one that seriously threatened the prosperity, if not the very life of the society. Five hundred dollars was retained in the treasury and a fire-brand extinguished.

The annual cattle show and fair was held later than usual on account of the fairs of surrounding counties; on the 5th and 6th of October. Although both days were extremely wet and stormy, it was a success in every particular. No finer or better exhibition of thorough-bred cattle was ever secured by the society, and the best of satisfaction was given both to exhibitors and spectators. No little aid was extended by one of the younger members of the society, by entering his large herd of thorough-bred and grade cattle, forty in number, for exhibition only; not competing for premiums. The number of entries in sheep was quite inconsiderable compared with former years, although in the different classes of long or coarse-wool sheep, many fine animals were exhibited, evincing care in breeding and keeping, and, also, that in that class of stock-husbandry, the farmers of Livingston county, are making decided improvement.

There was not quite the usual number of entries in the different classes of horses, yet the average for actual worth was as good as ever before. The exhibition of swine was unusually good, both as to number and quality. In fact, as before remarked, the fair was a success, and had we been favored with pleasant weather, it would have far eclipsed any previous exhibition as a pecuniary success. The treasurer's report, hereto annexed, will show the financial condition of the society.

Under the good providence of God, who has promised us a return of seed-time and harvest, so long as time shall last, our farmers have, during the past year, had abundant reason for gratitude. In some respects the harvest has not been so abundant as in some former years, yet I can safely say the harvest has been abundant.

The fall sowing of the previous year was *very late* on account of the summer having been unusually cold, and the effect of it was seen

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in many a wheat field before harvest, and fully realized at harvest if not before. In almost every instance when early sowing was done, the result was a good crop, both in quality and quantity. So far as I am able to ascertain, the wheat crop would average about fifteen bushels per acre throughout the county.

Oats, owing to the extreme hot and dry weather in the early part of the summer, were short on the ground, and in yield also, while the corn crop was unusually large, and far above the average in soundness and quality. It was also fully two weeks earlier in ripening.

Corn fodder was considerably damaged before secured, which, with the short oat crop, has the effect of making coarse fodder rather scarce. The hay crop was rather below the average on upland meadow, but generally the quality was good.

RECEIPTS.

Cash on hand December 31st, 1869	$942 73
Appropriation from State for 1869	297 37
Memberships	256 00
Sale of tickets at fair	668 78
Rent of ground	50 00
Rent of stables	52 50
Eating stands on ground	60 00
Donations	98 00
	$2,425 38

PAYMENTS.

Premiums paid	$1,003 80
Salaries of officers	200 00
Printing	144 17
Lumber for repairs	76 26
Labor fitting grounds	144 96
Clerks in office, marshals, store expenses, and other accounts,	256 05
Cash on hand	600 14
	$2,425 38

WM. A. BRODIE,
Secretary.

MONROE.

At the annual meeting, January 12, 1870, B. M. Baker was elected President; L. D. Mitchell, Treasurer; and John R. Garretsee, Secretary.

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B. M. Baker, the president elect, on account of the pressing amount of other duties on his hands, declined serving. At a special meeting, called for the purpose, Leonard Buckland was unanimously chosen president.

The annual fair was held October 11, 12, and 13, and was an entire success. The attendance was very large, and the number of entries unusually so.

The show of cattle and horses was said, by good judges, to be the finest ever seen on the grounds, with the exception of the exhibitions of the State Society, held on the same grounds; while that of implements and new inventions would not have disgraced a State fair. This fine show was owing mainly to a new policy of the board of managers; that of throwing down bars and inviting competition from those outside the county, as well as from citizens. The annual address was delivered by Prof. A. A. Hopkins, editor of the American Rural Home, and was listened to with marked attention and approval by a much larger audience than usually listen to addresses at our fairs.

Besides the usual annual repairs to be made on the grounds and buildings, about $1,500 were expended in permanent improvements, among which was a spacious and well-built dining-hall, furnished complete.

The receipts and disbursements for the year were as follows:

Receipts.

Amount in treasury from 1869	$347 16
received from the State	482 77
received for rent of track	100 00
received for old dining-hall	45 50
received proceeds of annual fair	2,278 57
received proceeds of note given by managers	1,000 00
	$4,254 00

Disbursements.

Bills paid for building and expenses of fair	$2,571 56
Paid for premiums awarded	1,593 50
Balance in treasury	88 94
	$4,254 00

JNO. R. GARRETSEE,
Secretary.

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ADDRESS OF PROF. HOPKINS, AT THE MONROE COUNTY FAIR, ROCHESTER, OCT. 13.

Mr. President, Ladies and Gentlemen: It seems fitting, upon such an occasion as this, and the more so because of an almost universal custom, that we should glorify ourselves a little.

We, Americans, are given to self-gratulation. Our country is the proudest the sun ever shone upon. Our rivers are the grandest rolling seaward; our valleys the most beautiful that trend back to the mountains; our mountains the most sublime. No soil is richer than that we cultivate; nowhere does the toiler reap richer reward for his labor than is ours. Our institutions are the best under heaven; our government, the one only to be admired, *when our party governs!* And we are the modern Israelites, God's favored people, who have spent our forty years in the wilderness, and finally abide in the promised land, minus our Moses!

All this in our own estimation. Why, then, should we *not* glorify ourselves at every public opportunity? Why, coming together as here to-day, should we not grasp each others' hands in hearty fellowship, rejoicing that in this our land of promise the milk and honey flow so freely? It is good to be glad. It is proper to satisfy one another with hopeful words. The best augury of American success is American faith. Belief in ourselves is the great lever that can lift a world.

But in the brief address which I have the honor to give this afternoon, I shall do little in the way of general glorifying. Of our possibilities as a people, Mr. President, none can speak too warmly; of our accomplishments, let others sing the praises. The first are grander than the last, though even modesty will admit these to be of some moment, and we shall do well to dwell upon them longest.

The coming man is among these possibilities; and, like his somewhat famous antetype, the first of humanity that earth ever knew, he will be a farmer. Of the coming farmer, then, might I appropriately speak to-day, typifying in him *all* the possibilities that are ours; and the theme attracts me strongly. But I pass it by. We shall know the coming farmer, when he comes, unless he be disguised in pigtails and sandals, and speak "broken China." And we shall greet him right cordially, as becometh hospitable folks, and congratulate him on being able to earn his bread by the sweat of his steam-plow and his hired man's face.

And, thereupon, we shall go and buy ourselves a steam plow, individually, with all the other fixings; and shall sit on the porch in the afternoon of life, looking over our broad acres, and dreaming pleasant

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dreams; our homes very temples of content; ourselves, wives and babies, happy almoners of plenty.

Our future has something pleasant in it; let us never doubt that. But to-day must deal with to-day. We cannot keep debit and credit with time. "Pay as you go," is his motto. Attend now to the things of the present, should be our inflexible rule, else we in no wise prepare for the future.

So, amid our dreams of the coming farmer's perfect home, let us look at homes as they are to-day, and see if, perchance, they may not be bettered before that looked-for individual shall come. It is barely possible that the coming farmer may not make his advent fully grown; he may be a development of some even now existing circumstances.

Surroundings shape the man; nothing is truer. On the larger scale, surroundings will mould the generation. See to it, therefore, generation of to-day, that you make wise surroundings for the generation of to-morrow.

Because I regard this a matter of vital importance, and not less truly practical than others which you may have expected to hear discussed, I shall devote the time allotted me to considering the

REORGANIZATION OF HOME-LIFE ON THE FARM.

"Is such reorganization desired?" is the first question naturally arising; and "Is it possible?" the doubter next inquires. That it is both needed and possible, I shall endeavor to show; as, also, to some extent, what the reorganization should be.

Before so intelligent an assemblage as this, it is hardly necessary to cite proof touching the first point. Indeed, proof is scarcely necessary at all; the fact is admitted, even in the very best communities.

"The home-life of the farming class sadly needs reorganizing," wrote a Monroe county farmer to me, only a few days since. His was thoughtful testimony, not to be gainsayed.

"*Farmers' homes are boarding-houses for hired help*," he continued, "*and farmers' wives are almost bond-women. The larger the farm, the worse the servitude.*"

Look about you, everywhere, and see if the facts do not corroborate his evidence. "Boarding-houses for hired help" accurately describes the generality of farmers' homes. On a farm of two hundred acres, more or less, there are usually two or three laborers by the month, and as many more by the day, perhaps, in the busiest season. These, as a rule, board with their employer. That his wife is almost a bond-woman follows as a matter of course.

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How can she well be otherwise? From March to December anyway, very likely the whole year round, there is the hired help tying her at home. Her good man goes off the farm every day nearly, to the mill or the post-office, and feels a lessening of the burden in social intercourse with his fellows; she labors on, day in and day out, week in and week out, fortunate even if she get to church of a Sunday, the hardest worked person in the whole family, the one whose labor is never done, the one whose toil has smallest compensation.

There is no sadder picture anywhere than some farmers' wives I have seen. The look of weariness on their faces is eloquent of sighs, sighs for a happy girlhood gone, for a life with somewhat in it sweeter than drudgery. Do they complain? Rarely, to their husbands. They are good wives, as the term goes; they accept their burden, and bear it bravely as they may, with no loud-voiced lamentings.

We, whose work is for the public, and whose duty it is to help right every wrong, get letters from them, sometimes, that are full of the heartache. They write to us what they seldom give utterance to otherwise, their discouragement, almost their despair.

They tell us how, in the years intervening since their marriage morn, toil and his twin-brother care, have held them captive continually; how their husbands, by constant contact with the outer world, have grown into a broader life, while theirs has narrowed down to the kitchen's confines; how they feel themselves becoming a less and less fraction of the married unit, instead of keeping even growth with their companions; how they long for a wider outreach, and a nobler, more satisfying life.

And these are not the women whose desired broadening of being takes in the pulpit, the platform, or the polls. Their aspirations are not of that character at all. What they do wish, what their patient long-suffering should entitle them to, is such a reorganization of the home-life as will give them some leisure for personal comfort, personal culture, and personal growth.

"Is it possible?" comes in the question. It is proved so, in many instances. "I have always boarded my help until the present season," said a farmer to me, early this summer, "but I shall never do it again. I built a tenant-house yonder," and he pointed to a neat little domicil twenty rods from his own, "and it has paid its cost already in the added privacy and quiet it has enabled me to enjoy, and in the great lessening of work for the women folk."

Tenant-houses will pay their cost always; will pay it directly in dollars and cents, in the long run; will pay it indirectly, in the man-

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ner my friend indicated, within the first year. Every farm, large enough to require help the season through, should possess one.

It is not quite clear to me that women's millenium is coming through the ballot; but I am morally certain that something very like a millenium will come to many women by the general erection of houses for hired help. The good time *is* coming, ladies; you must call upon your husbands to fix the date.

I preach the sweet gospel of hope to every troubled matron who, like Martha of old, is cumbered with much serving, and bid her take heart again. There is to be somewhat besides "eternal dishwashing" in your future; somewhat besides the never-ending round of washing, baking, churning, ironing, mending, and the like. It may not be suffrage; I almost hope it will not for your sake, and for our sakes to whom Ruth is the sweetest type of womanhood, and who would have you remain a Ruth forever; but it will be a somewhat better than suffrage, be that never so good. It will keep the light in your eyes and the love in your hearts, and under its kindly influence you shall grow younger, as the years go on, until, a happy girl once more, you sit beside your Boaz on life's harvest eve, glad with abundant gleaning, grateful for your being and its fruits, your home a pleasant foretaste of that heaven beyond the twilight.

Such a reorganization of home-life on the farm as I could wish wrought out, would comprehend much more than the building of tenant-houses. While that might be the initial step in many cases, the work would extend further by far, and would touch very nearly the home's centre.

There is a widespread desire on the part of farmers' boys to leave the farm. They are flocking to the cities by thousands. And why? Because there is something radically wrong in the home-life. To them it is repressive. Its opportunities are few. For its drudgery there is no adequate compensation. As with the wives, so with the boys; they do the most disagreeable work for the least pay; just their board and clothes; and get least credit for it. You will find it so upon nine farms out of every ten in this as in every other county.

Small wonder that, under such a system of things, the boys look about them for other leadings. Less wonder still, when we consider, further, that there is so little at home to attract them, so little wherewith they may help themselves upward.

Herein lies the chief difficulty in this matter: Farmers' homes are not supplied liberally enough with healthful attractions and objects of interest. Beginning in debt, many farmers say they must spend

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nothing for luxuries until that mortgage is paid off, and a little sum laid by for a rainy day. But these things, desirable for youth's content and welfare, are *not* luxuries; they are absolute necessities, regarded in the wisest sense.

"Books ain't o' no use to us," says good old Hardfist, "and I'll have none of 'em. Can't have *my* boys foolin' away their time in readin'." Well, what is the result? Hardfist's boys get tired of the dull hearthstone of evenings, and, leaving their patient mother darning their socks, and their foolish old father nodding over his pipe, they run down to "The Corners."

Loafers' yarns are pleasant to their ears; bar-room stories have for them peculiar fascination. They spend all their evenings away from home, finally. You know what is coming. By-and-by good old Hardfist is horrified to see one of *his* boys brought home drunk, and the patient mother well-nigh cries her heart out over the wreck of her first-born.

Have I overdrawn the picture in these few rough touches? I should be glad to think so. Young life is so beautiful in its promise that I could wish there were never any sad fulfillments. But I know many men to-day who are of no use to themselves, of no use to their families or society, except as painful examples, who, I firmly believe, might have been saved to nobleness by proper care at home.

A few books, judiciously added to, a little music, some simple games, and *parental interest in all these*, would brighten the home-life wonderfully. Some time since I was conversing with a well-to-do farmer in regard to this matter of music at home. "Five years ago," said he, "I fairly scouted the idea of having a piano in the house. Now I wouldn't take a thousand dollars for mine, unless it could readily be replaced."

Yet the man had no ear for music; cared nothing for it; didn't know Yankee Doodle from Old Hundred, so far as melody was concerned. But he had a fine stock of boys and girls growing up, and "it helps to keep the children home evenings," was his sensible conclusion.

But music is only a refining amusement, and it has a welcome now, in some form, in the majority of homes.

Books are mental necessities; yet look at farmers' libraries to-day. On an average, a score of volumes is all the farmer possesses. And what are these? Relics of a bygone generation, mostly; with here and there a later addition, selected for almost any reason other than fitness for youthful perusal. I can imagine no drearier desert for young

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young minds to traverse, than this state of things affords. But for the weekly newspaper, which finds so general patronage, there would not be an oasis to gladden them anywhere! Stop! I forgot the dime novel. That is the solace of thousands of boys, hungry for something to read. Every ten cents they chance upon, goes for the dime novel. Half the rising generation revel in dime novels to-day, because read they will, and they get the best they are able to. At any rate, this is the prime reason. If a taste for such literature be developed, as is almost certain to be the case, and if the dime novel continues to fascinate after something better is offered, who is to blame?

Could parents generally realize the alarming amount of trash, aye, worse than trash, that forms the mental sustenance of youth at the present time, the work of reorganization in this particular of home-life would begin speedily.

The dime novel multiplies itself by hundreds of thousands all over the country; and there is no species of literature more despicable, wearing the cloak of decency. It is a literary abomination, and should be suppressed by parental authority. But if suppressed and no substitute offered, what then? Smothered rebellion, and the dime novel in secret, probably.

So the farmer's library, something worthy the name, is imperative. It must have a place in the home-life. What shall it be, then?

Fox's Book of Martyrs is not, on the whole, the most cheerful reading; let us have something of another character. History is good, carefully selected; biographies are better; travels are more interesting, and nearly as profitable; scientific works are desired, if popularized; and a little good fiction and some poetry will pleasantly season the whole. Two or three hundred volumes, comprising proper proportions of each of these departments of literature, will make a respectable library.

"But hold on," says one; "such a library would cost as much as that ten-acre wood-lot I've wanted so long. I can't afford both; and the wood-lot I *must* have."

Very well, my friend; *take* the wood-lot, and have wooden-headed children, too, if you choose, as you certainly will with no library at all!

But hold a minute, yourself. Can't you *possibly* afford both? It is by no means necessary, nor is it best, that you should purchase your library complete at once. Twenty-five dollars a year, judiciously invested, will buy, say, fifteen volumes; in ten years you will have one hundred and fifty, a larger number than ninety-nine out of a hun-

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dred farmers accumulate in all their lives. Make it fifty dollars a year, and you will have the one hundred and fifty volumes in five years, and will be none the poorer.

Add other twenty-five dollars, or half the sum, for the purchase of papers and magazines for your family, and the interest will return to you tenfold. Such an outlay will furnish reading matter of excellent quality for old and young, and can be met, if in no other way, by curtailing sundry unnecessary expenses incidental in every family.

The future will demand of the farming class a higher average culture than now obtains. Mankind, womankind too, let us hope, is growing into a broader life. In this growth the farmer must keep even pace with his fellows. He must hold to and develope his individuality. To this end, every means within his reach should be employed. It is to this end that such reorganization of homes as I counsel directly tends.

There is too much of the tread-mill movement on the farm; just an endless going on, with no progress. Now that labor is so materially aided by machinery, there is no earthly reason why the farmer should himself *be* a machine. On the contrary, there are reasons numberless and cogent why he should be the freest agent in our whole social system; why his manfulness should develope most gloriously.

All his surroundings are expansive in their influence, if he but think so. What his life may be, in its widest outreach, is continually suggested to him by voices that never weary in their suggestings. If he hears them not, it is because, deaf to the better things about him, he heeds only the jingle of the almighty dollar, supposing specie payment to have been resumed, or the rustle of the almighty greenback, and cares for nothing more.

I shall not go into a rhapsody over the farmer's occupation, as is so frequently done on similar occasions. Kid-gloved exquisites, who never handled a hoe, or swung a scythe, or turned a furrow, see more glories in the farmer's labor than are commonly discovered on close acquaintance. *Toil is toil* in the whole range of industry; and I know, from personal experience, that much of farm work is toil of the hardest.

Yet there is a little poetry in the dullest prose of life. One man hoes corn all day, and sees only weeds under his feet and blisters on his hands. His companion, doing just as much work, and doing it as well or better, sees the mystery of growth ever at his side, is interested in it, and is made glad by the thought of what that growth means to the world.

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To one, the labor is only drudgery; to the other, something hardly less sweet than a promise.

Individual taste has not a little to do with this difference, to be sure; but individual culture may do quite as much. It is for this reason, if for no other, that I would have the farmer's developement rounded and true; that his labors may seem the lighter, and prove more satisfying. The more a man has in his head, the more he will see all around him.

The persons who sneered at "educated farmers" are dead and buried, thank fortune; or dead, and don't know it, and *ought* to be buried. No man *lives* to-day who sneers at education anywhere. He who does it is but an ossification in human form, and as great a social humbug as the Cardiff giant himself!

Being good in the abstract, education is especially good for the farmer. Of the real, practical kind, I mean. No other occupation can practically employ so many branches of learning as can the farmer's. Any fool can *get a living* on the farm; yet the most learned can there make use of all his knowledge to profit.

A man is a better farmer for being a good chemist, for understanding geology, philosophy, natural history, and, in fact, all the departments of science, even of literature. He can make his farm pay better in a hundred ways, through thoroughly informing himself upon chemistry and geology, by comprehending its resources and its needs more fully.

Moreover, these and kindred studies will enable him to do his work easier and more quickly. Besides, the time the farmer spends in reading, study, and reflection, in a hygienic point of view, is beneficial. There are two great classes of men who pursue their special avocations too closely for their own good; farmers and professionalists. To keep the system in its normal and healthy state, there should be alternate use of the muscles and the brain. Farmers use the former too much, and the latter not enough. As a consequence, you will see farmers breaking down with overwork physically, and lawyers, editors and others, particularly editors, killing themselves by overtaxation mentally.

It would be well, if, in these days of labor strikes, the farmers should strike for the ten hour system in their own behalf. They might gain their point by appropriating two or three mid-day hours to their library, if they *must* chore until nine o'clock every night.

And then, speaking still in the interest of good health, a week or two of absolute recreation should be taken every summer. A little

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journey off somewhere, to get away from every-day duty, once a year, is better for husbands and wives than medicine. Hotel charges are pleasanter to settle than are doctors' bills. Travel is kinder to us than is sickness, and leaves happier recollections.

Husband and wife get nearer their early loves and hopes in a fortnight's journeying, with no home cares to perplex them, than they otherwise do in a twelve-month. Because such is the fact, if other reasons were insufficient, the summer's excursion should not be foregone. Home seems dearer than ever on your return to it; the blood leaps quicker in your veins; and life seems as fresh and sweet almost as in the days of your courtship.

It follows, logically, that culture of the individual will bring about adornment of the home. The one compels the other. Think of a thoroughly intelligent, manly farmer, well read in current literature, posted in daily events, a student of men and times, living in a tumble-down old house, with the clapboards half off and unacquainted with paint, the front yard a goose pond or hog pasture, not a fence about, nor a friendly tree!

You see such a home occasionally. *Home*, did I say? I beg pardon of the dear old word. Such a place is in no sense home. The only attribute of home it can possibly lay claim to is the careworn woman whose home it is, who buried her youth and her spirit years ago, at the invitation of a brute, and who now sits over their grave in mute despair, too broken-hearted to weep, too discouraged to complain!

There is no reason why rural adornment should be monopolized by retired city people. It comes within the reach of all. In its simpler forms it is possible to every farmer. It should be properly appreciated by all. When it *is* so appreciated, you will see not only pictures within the farmer's home, for rural adornment should begin indoors first of all, but the home will itself *be* a picture worth the sketching.

Every possibility of landscape effect, by the grouping of trees, the massing or cutting away of foliage here and there, the placing of hedges, and the erection of rustic summer houses and arbors, will have been improved. Wandering brooks will have been made to do duty as fish-ponds, thus yielding pleasure and profit, until waterscape vies with landscape in beauty; and harmony of tone and color will enhance the general loveliness.

Such adornment requires no great expenditure of capital; but it demands cultured taste, and some time. That it returns a larger interest than almost any other investment possible on the farm, who will deny? Good buildings are requisite, certainly, but money shows

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better invested in ornamental surroundings of these than in handsome filligree work on the buildings themselves.

It may be true of woman that "beauty unadorned is adorned the most;" yet the saying doesn't hold good as applied to rural architecture. The plainer kind, with tasteful adornments about it, pleases best of all, is most truly beautiful.

Trees, flowers, and shrubs, call for popular admiration, not the special regard of a class. Landscape effect, the beauty of group and form, are not alone for the educated artist. They speak eloquently to every cultured soul. They have a language which all may understand who will. It is their mission to uplift and ennoble the commonest lives. City toilers, to whom they are a possibility only on a few summer days, feel their influence, and return to din and duty profited thereby. Why may not the country worker, to whom they are an ever-present blessing, realize their upliftingness *continually?*

Why he *may* not, none can tell, for there *is* no telling; why he *does* not, is plain enough. He looks down too much, and not enough up and about him. His horizon is bounded too frequently by the field's limit in which he toils. If he look skyward at all, it is to calculate the chances of rain, and not to admire the beauty of cloud-form and color. His city cousins come, and go into raptures over field, forest, and flowers; he considers that field's adaptability to wheat, and that forest's early removal, and wishes "them weeds" were turnips!

This is the truth's extreme, perhaps; but the medium is not so much better as it ought to be. And because there is so much room for improvement generally, I would urge a reorganization of home-life in *this* particular—would make the home *thinking*, and then the home *being*, of a finer character.

From the farm are to come the men of the future—stalwart men—men who will make the future's history. Every outward influence, every interior circumstance, therefore, of the farmer's home, should look to manful developement. In every way that can contribute to manly growth, the home-life should be reorganized and improved. Some of these ways I have indicated; the subject is fruitful, and might well engage our attention longer. But I have offered what I regard the *suggestive* ideas embodied in it, and leave their full working out to yourselves.

I believe in a better manhood and womanhood. All civilization points to it. And nowhere else can the betterment be so perfectly wrought out as in the farm-house. Nowhere else are the possibilities so great. Social evils seek the farm last, and find there their most

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uncongenial atmosphere. Pure morality has its best disciples growing up around the rural hearthstone. When I speak, therefore, of what the home-life is, and may be, I have in mind the future's possibilities—humanity's needs. I speak not alone in the interest of to-day—though what I urge has to-day's best interest in it—but in the interest of the world's to-morrow!

Mankind is coming into a closer unity. Class and caste are throwing down their barriers. Men walk shoulder to shoulder in the onward march of progress, nor question each other's right of presence.

Foremost in the van should be the American farmer. American, by no chance of birth, by no fortune of blood; but American by belief in American ideas, by earnestness in American reform, by faith in American hopes. His opportunity is at the very front. May the home-life place him there speedily, full statured; his growth, a beautiful blending of the physical, mental, and moral, his complement, the coming woman, clad in all womanly graces, content in her perfect womanliness, as complete a developement as himself—the AMERICAN FARMER'S WIFE!

MONTGOMERY.

The meeting for the election of officers for the ensuing year was held at the court-house on the evening of the first day of the fair, September 20th, and the following were elected: President, Simeon Sammons, Fonda; Secretary, A. H. Burtch, Fonda; Treasurer, T. R. Horton, Fultonville.

The constitution was amended so as to provide that the members of the executive committee to be chosen this year should hold their offices, one for one year, one for two years, and one for three years. And that, thereafter, there shall be annually elected one member of said committee who shall hold his office three years.

TREASURER'S REPORT.

Receipts.

Tickets sold at the fair	$1,713 15
Voluntary subscriptions	300 00
State appropriation	260 81
Entries and stand rents	244 32
	$2,518 28

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Disbursements.

Premiums	$1,307 23
Paid on mortgage	319 00
Fair expenses	228 44
Improvements and repairs	373 55
Printing	128 00
Cash on hand applied on mortgage debt	162 06
	$2,518 28

A. H. BURTCH,
Secretary.

NIAGARA.

The board of managers of the society have now seven monthly and two special meetings during the year usually well attended.

The spring fair was appointed to be held on the fair grounds on the 7th of May, and owing to the state of the weather it was postponed four weeks to June 4th, at which time there was a good show of stock, horses, and other animals, and, also, of farm implements; but there were no premiums offered or paid. And as the secretary, Mr. Nichols, had moved away, no minutes of said show were entered on our books. At the meeting of the board in April, a committee of three was appointed to change the location of the track on said grounds, which was done at quite an expense; and we think, with slight repairs next spring, we shall have the best half-mile track in the western part of the State. The society mortgaged their grounds for a loan of twelve hundred dollars to pay an indebtedness caused by the erection of a large two-story frame building on the fair grounds the year before, costing $2,821. The building being used in time of the fair as fruit and floral hall, and for domestic manufactures. The annual fair was appointed to be held October 6th, 7th, and 8th, but owing to a heavy rain it was postponed to the 13th, 14th, and 15th. The weather proved pleasant, and the entries were much larger than for some years past on all classes except cattle. The show of horses far exceeded that of former years; also that of sheep, especially of coarse wooled. There was also a largely increased interest in swine.

The receipts of the three days fair, and from rents of ground and other sources, except the loan above referred to, amounted to $2,616.17.

The amount of premiums offered in all classes was about $1,550; of which $981.25 was actually awarded, and $968.25 actually paid. The other expenses of the society are those of the fair, $280.59; repairing the track and building, $252.98; printing, $164.75; police, inter-

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est, etc., $134; making the sum, for which I have drawn orders on the treasurer, aside from the loan referred to, $1,800.57. Leaving a balance in the treasurer's hands of $815.60, which the society now propose to use in putting up permanent sheds on the fair grounds to accommodate the stock during the fairs.

The collection of agricultural statistics for the last year in this county has been neglected, and the officers of the society have no means at hand of making statements of the yields of the various crops raised in our county for the year. There have been no blanks sent to the county secretary, and consequently none sent to the several towns for the collections of such statistics.

At our annual meeting, January 3d, 1871, the following persons were duly elected officers of the Niagara County Agricultural Society for the coming year, commencing 1st of February, 1871: For President, Elisha Moody, of Lockport; for Secretary, Geo. G. Moss, of Lockport; for Treasurer, Edward Simmons, of Lockport.

F. G. SCOVILL,
Secretary.

ONEIDA.

The thirtieth annual exhibition and fair of the Oneida County Agricultural Society, took place at Rome, September 19th, 20th, 21st, 22d, and 23d, 1870.

As was the case the previous year, so now a kindly Providence favored the society with a succession of days for the exhibition, marked by the absence of rain. Indeed, for the chief days of the fair, the skies were almost cloudless.

The fear expressed by some members of the society that its exhibition in the various departments would prove defective, both in quantity and quality, because of the proximity of the State fair, (in point of time and locality), seemed to act as a spur to those whose interest in the old county society may have been flagging of late; and such fear was itself put to flight by the lengthened list of entries of the first day of the fair. As a consequence of the revived enthusiasm of the members, and the increasing interest of agriculturists generally in varied lines of improvement, several departments of the exhibition exceeded, in variety and in quality, anything known therein during former years.

Of horses, the display was better than an average of the shows made by the society during previous years. The entries were nume-

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rous; and owing to the strictness of the society's rules, no premiums were given to any but worthy specimens. In each class contemplated by the society's schedule, there was interesting competition with the exception of the sixth class, which was, in a manner, *special;* and for competition in which, no entries were made; it being for the best stock horse owned in the county, exhibited with *ten colts*, sired in the county, three years old and under.

The exceedingly dry weather prevailing at the time of the fair, while very favorable in most particulars, operated against the display of horses decidedly. The track upon the ground being very dusty, and rendering it impossible to make any general display of horses thereon, without throwing a cloud in the very eyes of those most interested in this particular department. The patience of the judges upon the various classes was equal to the emergency, however, and their decisions universally acceded to. On the second, third, and fourth day of the fair there was trotting for a variety of premiums. The trotting in each case was fair, and premiums fairly won.

In the stock department there was, in general, the finest display made on the society's grounds for many years. Cattle of all classes and ages were to be seen by the lovers of good stock; and fine opportunity was given each for the comparison of breeds in all of those points that meet the eye. Devons and Durhams, both thorough-bred and grades, rather led the exhibition, and indicated the choice of the practical farmers of our county. But good specimens of Ayrshires, Jerseys, and natives, were not wanting. So general, in fact, was the display of varieties, that he among farmers who observed with any attention, must have been a dullard indeed if he did not profit by hints thus gained.

Of sheep, the display was not large, though more than respectable in point of quality. The increased attention paid to dairying by our farmers of late years, has effected this department of husbandry, and of our fair, unfavorably.

Similar remarks might, perhaps, with justice, be made in connection with the exhibition of *swine* at the county fair. Albeit some recognized peculiarities of the *swinish disposition*, resulting in difficulty of transportation for any considerable distance, may possibly interfere with the success of this particular department in a county as large as ours.

In the hall upon the society's ground assigned to the display of entries in the vegetable and dairy departments, a good show of the more ordinary vegetables was made, and evidence given therein of an

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increasing attention on the part of *farmers* as well as professional gardeners to the improvements made of late in the introduction of more choice varieties of the common vegetables. But aside from the show of these kinds, more commonly raised for household or stock consumption, such as potatoes, pumpkins, squashes, beets, carrots, turnips, onions, etc., there was a fine display of the newer and choicer varieties of garden vegetables, not so often met with among farmers. Many of these tokens of an improving taste doubtless came from the stock of our market gardeners, but the names on other specimens indicated that the farmers of the county do not intend to be left behind in the improvement of such means to vary (and render more palatable thereby) the "daily bread" of their household. Yet it is to be remarked and to be regretted, also, that our agriculturists do not pay such heed to this branch of their great pursuit as would be conducive to the comfort of their families, and completely consistent also with success in the other branches thereof, for which the soil, climate, and natural productions of the county are best adapted.

In the floral hall interested observers might find specimens in different lines of production well calculated to please a variety of tastes. The display of flowers of the garden or greenhouse varieties was elegant, and attractive in the extreme. The efforts of florists toward the cultivation of a taste for such a display are, of late, meeting with their appropriate reward, and many houses are gladdened with the greenness and more varied beauty of house plants, that even ten short years since knew nothing of such adornment or of the lessons such noiseless teachers may impart.

In the floral hall was to be found also a magnificent show of such fruits as are fit for exhibition at this season, more particularly of apples, pears, and grapes. For the latter, the season with us has proved particularly favorable. In the first-mentioned, it has proved remarkably forward, at least two weeks in advance of the average; and the orchards of the county have owned the kindliness of the season, and brought forth in lavish abundance, as any spectator of the exhibition in our floral hall would at once conclude. Size, shapeliness, and perfection of color were very noticeable in all the varieties of orchard fruit displayed.

Of grapes, perhaps, no greater display was ever made upon the society's grounds, as regards quantity and variety; and as to quality, those who know the almost universal superiority of this fruit this year will readily conceive that the samples displayed here were most excellent.

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In the different classes established for the ladies' department by the premium list, there was a very lively competition; one pleasing result of which was the adornment of the hall devoted to those entries by a real multiplicity of tokens of the skill and taste of the wives and daughters of Oneida farmers.

It would be hard indeed to conclude which preponderated in the wonderful display, the useful or the ornamental. To arrive at any just conclusion was rendered all the more difficult by the fact, patent to all observers, that many articles intended for real use were so tastefully and skillfully made as to be really ornamental also; and who in these days will venture to say that the beautiful has not its own peculiar field of usefulness too? That the women of Oneida county are all interested in the success of this department was convincingly manifest through the fullness and variety of the display therein; and the neat cards attached to some articles indicated that the interest was shared by all ages. Venerable grandmothers and sprightly granddaughters were in competition here.

In the manufacturers' department, the display of agricultural implements more than equalled that of any previous exhibition upon the society's grounds. This department attracted much attention from practical farmers, and many and various were the comments and comparisons made by shrewd observers. That some of the *dealers* (in such implements and in the other hardware needful for farmers' households) appreciated the opportunity afforded them in this department, was shown in the full display of sundry items of manufacture not carried on to any considerable extent among us. The enterprise of the gentlemen who thus added to the completeness of the show in this line, will doubtless be rewarded in a way decidedly pleasing to themselves.

The fair concluded on the fifth day (Friday, September 23d) with a balloon ascension, successfully made by one of the members of the press, who has given a record of his views and experiences to the public through the papers generally.

The total receipts of the society for the year were about $3,300; expenses about $3,000; balance in hands of treasurer a little over $2,800.

The annual meeting was held at Hampton, Tuesday, January 3d, at Hamilton's hotel. The attendance was large. The display of winter apples large; other fruits there were but few. Grain and root crops small, yet of good quality.

The meeting was called to order by the president, John L. Dean,

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at half-past eleven A. M. Committees on the various exhibited articles and on nominations of officers for the ensuing year were appointed, when the society adjourned for dinner. At half-past one the society again came to order. The State senator from this county, the four members of Assembly, Hons. S. Campbell, John Butterfield, B. W. Williams, O. B. Gridley, R. H. Jones, and James L. Blackstone, were elected representatives to the meeting of the State Society. The committee on nominations made the following report, which was unanimously adopted: President, John Butterfield, Utica; Treasurer, James Elwell, Rome; Secretary, Roderick Morrison, Clinton.

The committee on treasurer's books report as follows:

RECEIPTS.

Balance for the year 1869	$1,974 05
State Treasurer	621 56
Annual fair, 1870	3,324 83
	$5,920 44

EXPENDITURES.

Premiums	$1,519 50
Printing	351 65
Police	273 00
Labor	110 30
Salaries, etc	287 00
Annual address	50 00
Band	177 80
Hay and straw	55 00
Stationery, etc	70 24
Lumber	62 00
Rent of tent	25 00
Miscellaneous expenses	108 91
Cash on hand	2,830 04
	$5,920 44

B. W. Williams, of Rome, and L. Rouse, of Kirkland, were appointed a committee to conduct the newly elected president to his chair.

Mr. Butterfield briefly thanked the society for the honor, and promised that, with the aid of the members, he would see that no steps backward be taken. At three, P. M., the society adjourned to meet at the call of the secretary.

RODERICK MORRISON,
Secretary.

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ONTARIO.

On the last Wednesday of January, 1870, the following named officers were elected for the ensuing year: President, Harvey Padelford, Canandaigua; Treasurer, A. S. Newman, Canandaigua; Corresponding Secretary, John S. Coe, Canandaigua.

At said meeting it was resolved that a committee of one from each town in the county be and are hereby appointed to take into consideration the propriety of the sale of the fair grounds and property of the Ontario County Agricultural Society, the purchase of other grounds and fixtures thereon; and all matters pertaining to such sale and purchase as proposed to this meeting, including an estimate of the value of the property of said society; the cost of grounds proposed to be purchased; the cost of moving the buildings of said society thereto; the cost of fencing, ditching, and constructing a suitable driving park; and all necessary outlay to make said proposed grounds fit for use for the purposes of said agricultural society; also, such suggestions as they may deem proper as to the future regulations of said society for the use of such grounds by those who desire to improve the stock of horses by using the driving track thereon. That said committee make their report at an adjourned meeting of this society, to be held on the 9th day of February, then next. Which adjourned meeting was one of great interest, in which the matter of the sale of said grounds was fully and ably discussed. The opponents to the driving park claiming that our as well as other county fairs were being turned into horse racing, and that the interest of the society in agricultural matters was fast running down; consequently the committee reported adversely to the sale of the grounds.

During the war of the rebellion the interest of the people was centered in that direction; consequently our fairs were, in a measure, neglected, although they were kept up from year to year. And after the close of the war, and up to this year, very little interest seemed to be taken in the welfare of the society. This year the officers elect determined to bring up the interest of the society if hard work would do it. They consequently not only appealed to the farmers in person, but advertised the fair extensively through the county papers, and by means of several thousand circulars. As soon as the people saw that the officers had a heart in the work, they put a shoulder to the wheel and seemed willing to work. Although our premiums are much higher than most of our surrounding counties, still several of the wealthy men of the county offered special premiums, or raised those

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already offered. We, for a week before the fair, were aware that we were reaping the reward of our labor by the great number of entries thus early made, which continued up to the last moment of time for entries. The weather of the two days appointed for the fair, September 22d and 23d, contrary to the expectation of almost everyone, was all that could be desired; two of the loveliest of autumnal days. Early in the morning of the first day, the old and young of both sexes commenced coming from all points of the compass. Some by rail; some in wagons; some on horseback; and some on foot; and by noon the amphitheatre was crowded full, besides thousands roaming over the grounds. Allow me here to digress and say a word about our amphitheatre. As far as I am informed it is the finest county agricultural building in the State. It is built after the manner of the old Roman amphitheatres. Its circumference is six hundred and sixty feet; two hundred and ten feet in diameter, and thirty-two feet high. It has an exhibition room on the lower floor six hundred and forty by twenty feet wide; has, in addition on the second floor, nine hundred feet of tables, three feet wide, with an open circle in the centre of one hundred and fifty feet in diameter; and, from this open space, seats rise one above the other for the accommodation of spectators to see the prize animals brought in for exhibition. On the morning of the first day the articles brought in were immediately arranged for exhibition by the prompt committee of arrangements, and the exhibition commenced immediately. In passing around the upper room the improvement in the number of articles exhibited over many of the former years preceding was readily seen. Now every inch of available space was occupied, while, heretofore, only here and there could be seen things on exhibition. Here was seen home-made carpeting, flannel, woolen cloth, blankets, knitted quilts, worked muslin, tidies, pin-cushions, mats, piano covers, and, in fact, almost every kind of garments made by ladies, and in great numbers.

Here, too, was seen little girls' work of every description, especially dolls' hats, hoods, shawls, dresses, pin-cushions, aprons, etc. Here were seen oil paintings, pencil drawings, moss pictures, photographs, sewing machines, etc. On the first floor were exhibited the fruits, vegetables and family products. It was said, as for the family products, such as butter, cheese, bread, cakes, canned and preserved fruits, homemade wines and other articles of like kind, the entries were more numerous than had been for many years previous.

The show of garden vegetables, not large, but choice and of great variety. A mammoth squash exhibited by L. B. Gaylord, of Canan-

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daigua, but grown by Hiram Holcomb, of East Bloomfield, attracted great attention for its great size and weight, two hundred and seventy-two and a half pounds. The variety of machines and agricultural implements was very great. All the different kinds of reapers and mowers, and grain drills, etc., etc., now in use, were on exhibition. As to the cattle on exhibition, they were very numerous, and sufficient to have made a State exhibition. They were of all kinds and grades. Premiums were offered for the best herd of cattle of not less than five kept and owned by any one man. Several herds were on exhibition, which were very fine. Great praise is due to the Gooding brothers, exhibitors at the old-time fairs, but who had, of late, grown cold in the service; they entered some twenty-five head in all, of various breed and classes, and all good. The herd of Durham cattle entered by J. & A. McKechnie, was a show of itself and an honor to those enterprising citizens.

Sheep were numerous, and their number, blood, and quality, all went to testify to the high rank Ontario county holds in this branch of husbandry. Merinos, Leicesters, South Downs, and Cotswolds, vied with each other in the contests for premiums. Swine were not extensively, though fairly represented, but in numbers did not compare with sheep, cattle, and horses. Some very fine poultry was exhibited, but I did not view them very closely; suffice it to say I saw some fine Sebrights, Brahmas, Bolton grays, and black Polands. As for horses, we say that a larger and finer collection for all purposes was never, in our opinion, seen at a county fair. And if by chance any exhibitor did not find his name enrolled on the premium list, let him not charge it to oversight and favoritism, but feel an honorable and generous pride in that their county can do so well, and then firmly resolve to try again. It was to me a fine sight to see the matched horses, horses for all work, single horses for speed and proportion, etc., etc., drawn up around the centre pole in the amphitheatre, and the judges going many times around unable to decide on the best. A pair of white, three year old Mustang ponies, from Colorado, now owned by Mr. Austin of East Bloomfield, and exhibited by him, were beauties. A novelty of our fair this year is worthy of a particular mention. Premiums awarded for the best turn-out, consisting of not less than six horses, carriages and harness, either single or double, owned in any one town in the county, first premium, sixty dollars; second premium, forty dollars; third premium, twenty-five dollars. This was a sight very rarely seen. A great many were entered, and many of the most attractive ones were owned by farmers. They, of

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all men, can best afford to keep a stylish team and vehicle, for the common benefit of themselves, their industrious wives, and their honest-hearted children.

Our treasurer's report shows:

Received from former treasurer	$563 63
Voluntary subscriptions	1,973 44
Received of State Treasurer	316 88
	$2,853 95

Paid out by treasurer for repairs on grounds	$234 17
Advertising and postage	572 57
Premiums for January meeting	31 00
Expenses of January meeting	9 66
Insurance	62 50
Bills past due	21 05
Expenses of fall exhibition	243 48
Premiums paid	1,165 50
On hand	514 02
	$2,853 95

The entries, as we are informed, were the largest, with one or two exceptions, ever made; and the receipts were the largest, with one exception, and that was the year the amphitheatre was built. Then a special effort was made all over the county to sell life-member tickets for the purpose of raising money to pay for the amphitheatre. The fair the first day was well attended; but the second day the crowd of visitors was enormous. They were gala days of rare and unusual enjoyment.

JOHN S. COE,
Corresponding Secretary.

ORANGE.

The annual meeting of the society was held at Goshen, February 1, 1870, the president in the chair.

The report of the treasurer was read and accepted, and a vote of thanks tendered to him for the ability and fidelity with which he had discharged his duties.

The following officers were elected for the then ensuing year: President, Ellis A. Post, Goshen; Secretary, D. A. Morrison, Montgomery; Treasurer, J. W. Corwin, Goshen.

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An executive meeting was held at Goshen, July 16, 1870, for the purpose of designating the time for holding the annual fair; for adopting a premium list, and suitable regulations; for appointing the necessary committees; and for making other needful arrangements for the exhibition.

The thirtieth annual fair was held on the society's grounds at Goshen, October 4, 5, and 6, 1870. The attendance was large during the second and third days (the first day having been devoted to making entries and completing preparations). The animals and articles shown, in all the classes, were generally of superior excellence. In some departments, however, the number of entries was much smaller than ought to have been. The fair, taken as a whole, was fully equal to those of former years.

The annual address was delivered by Hon. William Fullerton, of Newburgh. It was highly creditable to the author, eminently suitable to the occasion, and was attentively listened to by a large and appreciative audience.

Although the past season has been, in some respects, unfavorable to the farmers of Orange county, a protracted drought having materially lessened the yield of crops, and the prices realized for most of the products of the farm having been less remunerative than formerly; still, it cannot be doubted that the agricultural interest in this county is in a prosperous condition.

Receipts.

Cash on hand, as per last report	$238 88
State appropriation	370 50
Gate, first day	646 00
Members' entries	112 00
Special entries	442 50
Gate, second day	393 50
Balcony	19 00
Rent of stands	40 00
Rent of grounds	75 00
Rent of hall	100 00
	$2,437 38

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EXPENDITURES.

Premiums	$1,267 50
Dividends	400 00
Sundry persons	356 94
Postages	1 55
Repairing track	45 00
Society for the improvement of horses	100 00
Cash on hand	266 39
	$2,437 38

D. A. MORRISON,
Secretary.

ORLEANS.

The fourteenth annual fair of the Orleans County Agricultural Society was held at Albion, September 16 and 17, 1870.

The receipts during the current year, exclusive of the State appropriation, are	$1,731 79
Add surplus on hand, January 1, 1870	164 18
Add State appropriation of 1869	182 81
	$2,078 78

The disbursements the present year are as follows:

Paid current expenses, and for building dwelling-house on fair grounds, etc	$1,475 33
Paid premiums	573 00
Leaving a balance in the treasury of	30 45
	$2,078 78

Officers for 1871 are: President, Allen P. Scott, Medina; Secretary, Peter Ferris, Albion; Treasurer, Cyrus Farwell, Albion.

C. A. KING,
Secretary.

OSWEGO.

The annual fair of the Oswego County Agricultural Society was held on the grounds of the society, in the village of Mexico, October 4th, 5th, and 6th, 1870.

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Below is a statement of the receipts and expenditures, viz.: The treasurer received from all sources, including the balance on hand, at last report, $3,602.18.

Amount expended:

For two and a quarter acres land	$225 00
For printing and repairs, labor, etc.	1,196 09
For premiums	788 25
Balance in cash on hand	1,392 84
	$3,602 13

The society is free of debt, now owns twenty-seven and a quarter acres of land, has two large and excellent buildings for exhibition purposes, and is, in every way, in a comfortable and easy position. Attached to this report is an article written by a gentleman of the village of Mexico, giving a history of the society from its commencement:

The officers elected for the current year are: President, M. L. Marshall, of Oswego; Secretary, J. B. Taylor, of Mexico; Treasurer, L. H. Conklin, of Mexico.

L. H. CONKLIN,
Treasurer.

HISTORY OF THE OSWEGO COUNTY AGRICULTURAL SOCIETY.

The Oswego County Agricultural Society was organized at the inn of George Gates, in the village of Oswego, on the first day of February, 1840.

The founders of the society were, nearly if not quite, all, at that time, residents of Oswego village. The more prominent names connected with the organization were Col. U. G. White, Alvin Bronson, Robert Oliver, Joel Turrill, and D. P. Brewster. Col. U. G. White was chosen first president; and the first fair was held at Oswego, October 7th, 1840, in the west public square.

Neither this nor the first succeeding fair seems to have attracted much attention from the farming community of the county, the very class for whose benefit it was more especially designed.

The second annual fair was held as before at Oswego, October 6th, 1841, Alvin Bronson being then president. The original constitution provided for holding all the fairs and meetings at Oswego; but owing to the fact above alluded to, that the farmers did not take the interest which had been expected and desired, President Bronson suggested

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the propriety of transferring the next fair and annual meeting of the society to some point in the county in the more immediate vicinity of the farming interest, and invitations were sent out by him to the people of the surrounding villages and country to attend the next annual meeting soon to be held at Oswego. In response, goodly numbers from the country attended, became members, and the constitution was so amended that the place for holding the future meetings and fairs should be determined by vote at the several annual meetings. Orville Robinson, Esq., then of Mexico, was chosen president, and Mexico designated as the place for holding the future annual meetings and the next fair, until otherwise determined. Peter Chandler was elected treasurer, and, realizing the importance of enlisting the farming interest, he employed men to canvass the county and solicit farmers to become members. Over one hundred new names were thus secured.

The fair of 1842 was held at Mexico upon grounds lying upon both sides of what is now known as Railroad street, between the present "Empire house" and the Methodist parsonage. This portion of the village was then a fine meadow and orchard. The ladies' hall, or as it was then called the "industrial hall," was at the Mexico hotel.

This fair was, at the time, regarded as a great success. A considerable degree of interest was awakened among the farmers. There was a fair show of stock, and the society was enabled to pay off the indebtedness which it had heretofore incurred, beside paying its premium list, of about two hundred dollars, and running expenses. It also had about forty dollars with which to commence the operations of the next year.

At the following annual meeting William Ingells, of Volney, was chosen president, but it was thought best to hold another fair at Mexico, which was accordingly held September 27th, 1843. This also was considered a success; but as parties from Fulton came forward, desiring the fairs to be held in their village, the location was then changed to that place.

It would take too much space to follow the several migrations of the society in detail; and as the treasurer's book of the old organization, and the secretary's records down to 1851 are not now at hand, it would be impossible to trace, with exactness, its several successes or failures. We give, therefore, a list of its several presidents, with place and date of holding the fairs.

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YEAR.	Name.	Where held.	Date.
1840	U. G. White	Oswego	Oct. 7
1841	Alvin Bronson	Oswego	Oct. 6
1842	Orville Robinson	Mexico	Oct. 5
1843	William Ingells, of Volney	Mexico	Sept. 27
1844	Seth Severance, of New Haven	Fulton	Sept. 25, 26
1845	K. E. Sandford, of Volney	Mexico	Sept. 24, 25
1846	Benjamin E. Bowen, of Mexico	Fulton	Sept. 29, 30
1847	Bradley Higgins, of Richland	Mexico	Sept. 29, 30
1848	Andrew Z. McCarty, of Richland	Pulaski	Sept. 27, 28
1849	Jervis N. Dewey, of Richland	Mexico	Oct. 26, 27
1850	Hamilton Murray, of Oswego	New Haven	Sept. 27, 28
1851	John W. Judson, of Oswego	Oswego	Sept. 10, 11
1852	Hamilton Murray, of Oswego	Fulton	Sept. 29, 30
1853	Hamilton Murray, of Oswego	Granby	Sept. 28, 29
1854	John N. Holmes, of Hastings	Central Sq.	Sept. 27, 28
1855	John N. Holmes, of Hastings	Mexico	Sept. 26, 27
1856	Harvey Palmer, of Parish	Mexico	Sept. 17–19
1857	Leonard Ames, of Mexico	Mexico	Sept. 15–17
1858	Avery W. Severance, of New Haven	Mexico	Sept. 15–17
1859	Orrin R. Earl, of Sandy Creek	Mexico	Sept. 13–15
1860	Thomas H. Austin, of New Haven	Mexico	Sept. 18–20
1861	Alvin Lawrence, of Mexico	Mexico	Sept. 17–19
1862	Hiram Walker, of Union Square	No fair held	
1863	Hiram Walker, of Union Square	Mexico	Sept. 22–24
1864	Luther H. Conklin, of Mexico	Mexico	Sept. 14–16
1865	Hiram W. Loomis, of Palermo	Mexico	Sept. 19–21
1866	Charles S. Cheever, of New Haven	Mexico	Sept. 19–22
1867	Benjamin G. Robbins, of Sandy Creek	Mexico	Sept. 17–19
1868	Morgan L. Marshall, of Oswego	Mexico	Sept. 15–17
1869	Morgan L. Marshall, of Oswego	Mexico	Sept. 28–30
1870	Morgan L. Marshall, of Oswego	Mexico	Oct. 4–6

The annual meeting of the society for the year 1850, adjourned to meet at Mexico the following year, but the president called a meeting to be held *as* the annual meeting at New Haven, at a different date from said adjournment. This action produced a double-headed condition which threatened to cause a good deal of trouble for a time, but the matter was afterwards settled by an act of the Legislature, procured at the instance of the branch which had met at New Haven, but not opposed by the other body. This act provided for the merging of the two societies into one, which went on as before with varied success until 1854, when it again became involved in debt.

In 1853 the State Legislature passed an act which was amended in 1855, providing for the incorporation of county agricultural societies.

Prior to this date the society has been much embarrassed at times by its inability to protect itself at law. Its funds had, on more than one occasion, taken a mysterious departure from their proper place of deposit, and the society had no power to reclaim them. It could not hold real estate, and hence could erect no permanent buildings, inclosures, or other structures for its accommodation. The itineration of the fairs had been found expensive, in that the outlay of each year to provide accommodations was useless and lost to subsequent fairs. The people, too, of different sections, had got in a habit of

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waiting for the fairs to come to them instead of going to the fairs, and there were no compensating advantages.

At the annual meeting of 1855, which was very fully attended, a committee of seven was appointed to report at an adjourned meeting upon the propriety of reorganization. This committee, composed of gentlemen from six different towns, made a lengthy and elaborate report in favor of the reorganization under the act of 1855, which report, at the adjourned meeting, was unanimously adopted, and the organization effected by the election of officers, filing of articles of association, etc.

It is not our purpose to go into the details of the strife which grew out of this action, either to justify one, or to condemn the other party. Wounds, nearly healed by the lapse of time, might be opened and strifes renewed. The society at this time passed through the most exciting and interesting period of its history. A portion, claiming to be a continuation of the old organization, split off, held one or two fairs at New Haven, and finally, by its permanent location at Fulton, condemned the principle of itineracy, for which it had contended, and by its subsequent success, demonstrated, most completely, the advantages of permanency of location.

This branch brought a suit in the Supreme Court by its treasurer against L. H. Conklin, former treasurer of the old organization, and then treasurer of the new, for the money in his hands, amounting to $178, and for a decision as to the regularity of the two bodies. This suit was carried on with great spirit for several years, being taken from the Circuit to the general term of the Supreme Court, and thence to the Court of Appeals; and finally decided by that tribunal in favor of the organization at Mexico, eight of the judges concurring in the decision. The seceding branch, after this decision, dropped the name of "Oswego County Agricultural Society," and assumed the cognomen of "Oswego Falls Agricultural Society," and has since been attended with a degree of prosperity which cannot be other than gratifying to every friend of agricultural and mechanical advancement.

The county society at this time purchased fourteen acres of land at a cost of $1,450, inclosed it, commenced the erection of buildings, and graded a fine track. Its total expenditures for land and improvements that year amounted to about $3,000.

The time for holding the fair was fixed for September 17th, 18th, and 19th; and as soon as such appointment was announced the branch society noticed its fair to be held upon the same day at New Haven. Notwithstanding this action on the part of that body, the success of

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the fair was far beyond all precedent. The number of members was seven hundred and thirty-six against three hundred and thirty eight, the highest number in any previous year. The total receipts were $1,287.33, an excess of $710.90 over any previous year. The number of entries showed a corresponding increase.

The following year the off-shoot society pursued the same tactics, appointing its fair upon the same days chosen by this society, and with a still more gratifying result to us. The total receipts for 1857 running up to $1,746.94; thus demonstrating that the motto, "opposition is the life of business," applies to sociéties as well as to individuals.

After the removal of the other society to Fulton, the spirit of rivalry died out and the receipts fell off to less than $1,000 per year for several years.

The society has been peculiarly unfortunate in regard to the weather. Of the forty-five days selected in the last fifteen years for holding the fairs, some twenty of them have proved to be stormy. It has encountered hail-storms and hurricanes; but worst of all the clouds of war so darkened the sky that for a few years these festal days seemed inappropriate.

In 1861 our floral hall was used for recruiting purposes. The addresses were not upon the plow and the pruning hook; not upon the peaceful pursuits of husbandry, but the talk was of the sword and of conflict. The appeals were to patriotism, and many there signed the recruiting sergeant's roll, who, ere another year, were enrolled upon the lists of the heroic dead.

In 1862, on account of the war, no fair was held, and the gross receipts of the society were only seventeen dollars. Since that time, (excepting the year 1866, when all *three fair days* were so paradoxically *unfair* and stormy, that a fourth had to be taken to declare and pay the premiums), the society has shown a steady and regular growth, until its gross receipts for the year now amount to about $3,000. We give below a table showing the exact receipts for each year since 1854.

The society now owns twenty-seven and one-quarter acres of land, one large floral hall, built in the form of a Greek cross, each section of the cross being one hundred and five feet long by thirty-four feet wide; one agricultural and mechanical hall, eighty-four by thirty-four feet; one commodious eating saloon, besides the secretary's, treasurer's, and other business offices; a good track and control of a fine spring of water, together with pens, stalls, posts, ropes, etc., etc.,

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for securing stock on exhibition; the total cost of which has been between $7,000 and $8,000. It has besides this a handsome sum now in the treasury, after paying all premiums and indebtedness. It has ever met all its obligations, promptly paying its premiums during the fairs, and as soon as declared.

The board of managers, in putting forth their pamphlet for the year 1857, used the following language: "They have not, nor do they intend to, allow any exhibition or performance of any kind on the fair grounds that shall in any manner conflict with the high moral sense which they are happy to believe is generally prevalent among the farming community." This rule has been rigidly adhered to. Considerable complaint has been made by certain classes that of late not attention and encouragement enough has been given to trotting horses. Since the making of the track, public sentiment has relaxed somewhat, perhaps, upon the propriety of horse-racing exhibitions. At that time the complaint was loud and quite general that too much attention was paid to fast horses, and that the track and all its influences were demoralizing. So much was this the feeling that, in the same pamphlet above quoted, the board defended itself in these words: "A word to those who have objected to the prominence given to the exhibition of horses, and who have doubts as to the propriety of using a track for such purposes." "We have endeavored to surround and guard this matter in all suitable ways and with every proper restriction, so as to encourage a due degree of emulation among all classes of those who rear horses, by offering premiums for roadsters as well as for style and draft horses; and furnishing suitable facilities for enabling committees to judge understandingly of their merits by witnessing their action, powers of endurance, such as would satisfy their owners and afford the best means of gratifying a reasonable desire among the spectators to witness such performances. This desire is natural; and is it not better to provide for it ourselves, and with proper restrictions, than to encourage a race-course? If rightly managed, our horse track will give all of the advantages and none of the evils, and, instead of our society being injured by the idea of a race course, it will be the latter only which will suffer." This principle has, we believe, actuated every successive board of managers from that time to the present; and if public sentiment has so changed that the efforts of the board in this direction no longer seem to satisfy the cravings of the present for excitements, is it not well for the community to take a sober second thought, and upon that decide whether the board shall not be sustained in its position upon this subject?

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We give below the table of receipts for the several years stated:

YEAR.	From membership.	At gates.	Other sources.	Total.
1854	$182 00	$171 25	$137 00	$490 25
1855	338 00	236 71	133 22	708 65
New Organization.				
1856	736 00	500 58	50 75	1,287 33
1857	808 00	444 42	502 32	1,746 74
1858	598 00	146 48	172 98	917 89
1859	431 00	216 59	170 30	817 89
1860	512 00	315 13	90 50	917 63
1861	393 00	161 35	16 00	570 35
1862	17 00	.....	.....	17 00
1863	689 00	334 46	693 43	1,716 89
1864	669 00	327 55	724 90	1,721 45
1865	1,051 00	474 56	436 92	1,962 48
1866	625 00	212 28	354 29	1,191 57
1867	1,089 00	587 58	573 25	2,249 83
1868	1,059 00	531 47	631 61	2,229 08
1869	1,359 00	762 73	635 06	2,756 79
1870	1,483 00	842 39	613 41	2,938 80

It will thus be seen that the society has, during the fifteen years since its permanent organization, received and disbursed, for premiums and expenses, including improvements to property and money on hand, $23,034.29.

Since its organization, a generation has passed off the stage of human action, and another has taken its place. Habits of men are changed. Different ideas now govern their action. The society, too, has undergone great changes. Formerly no fair was complete without its plowing-match; no annual meeting perfect without its society dinner. On one occasion the records of the secretary state that about 300 partook of a bountiful dinner prepared by the society. In another place we find the following record: "*Resolved*, That, at the next annual meeting of this society, an agricultural dinner be given by the society, each member participating to furnish his proportion of the necessary materials, such as meats, fruits, etc., etc." At the winter meeting the farmers, mechanics, merchants, and professional gentlemen of the county gathered together for social, mental and moral improvement, as well as to advance their society interests. Premiums were always awarded upon the best field crops, best farms, etc., etc. All this has now gone out of date, or nearly so, and the only festivities connected with the society are to be found at the fairs. These are becoming general holidays, or gala days, in which all classes meet upon one social level, business cares and anxieties are left at home, caste and social distinctions forgotten, and for three days "the people" have sole and undisputed sway.

The annual address by the president (or, as was sometimes the case,

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by his smartest boy in his stead), has of late passed out of date, giving place in turn to the efforts of some aspiring politician, distinguished lawyer, or agricultural editor. "The speech" has at last gone "up in a balloon."

It is a serious question whether more attention ought not to be given to the annual meetings, and whether a revival of the agricultural dinner discussions, president's address, etc. (to be given at the annual meeting, instead of at the fair), would not tend to awaken a greater interest, and promote the more valuable advantages originally contemplated by the organization.

The society has passed its infancy and youth, and, having arrived at the prime of life, should exhibit its mental and intellectual developement, at least to an equal degree with its physical and financial growth.

With the present age, the rapid advance in the arts and sciences, in invention, in internal improvements and facilities for intercommunication, both of thought and material products, in agricultural developement, and, lastly, in educational advantages, the society, now of full age, strong in its possession of the real muscle of to-day, money, occupies a position which enables it to accomplish a vast amount of good in the future. This should and must be its aim.

OTSEGO.

Officers: President, G. Pomeroy Keese, Cooperstown; Secretary, Horace M. Hooker, Cooperstown; Treasurer, Charles F. Hendryx, Cooperstown.

The report of the society for 1870, and of the fair, calls for but a brief notice at our hands. The fact that the society is soon to enter upon the work of preparing the new grounds for permanent occupation has deterred the board of managers from making any additional expenditures upon the present location. We have now held fifteen fairs under our new organization, and the grounds and accommodations, which were amply sufficient in the earlier years of the present management, have ceased to give entire satisfaction, and will soon give way to a more enlarged area, and, we hope, a more perfect fitting up in all the requirements of a progressive agricultural society.

It is a fact worthy of notice that, while we have three local organizations within the limits of our county, all of them, we believe, in a prosperous condition, the receipts of the parent society for the year

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1870 were larger than for any former year, and the results of the fair were highly encouraging. We are glad to welcome back into the ring a full representation of oxen and steers, a class of stock which has much diminished of late years, and which we would fain see once more restored to a leading position on our farms and at our fairs. Owing to the advanced season of 1870, the display of fruit, vegetables and flowers in floral hall was large and in full maturity; we do not remember ever to have seen a better display in this building. This feature of our fairs is yearly increasing in attractiveness. The other departments were fully up to the average, if we may except the sheep pens, which were lamentably deficient. Hops and the dairy have so far taken the lead in Otsego that, as a wool-producing county, we must yield to many others which once were far below us in the scale. The constantly increasing value of land for the past fifteen years seems to account in a measure for this change in production.

The board of managers intend to give their earnest attention, during the ensuing season, toward perfecting a plan for fitting up the new grounds, which we hope to make second to none in the State for convenience and beauty. With the experience of our own and kindred societies, and the hearty co-operation of all our members, we hope to make our record for the future as satisfactory and progressive as has been our history in the past.

RECEIPTS.

Cash in treasury, January, 1870	$628 78
Town bonds	700 00
Interest on town bonds	49 00
Received from sale of life members' tickets	30 00
Received from sale of annual members' tickets	1,188 00
Received at ticket office	1,649 14
Rent of grounds	372 84
United States bonds sold	3,405 00
Hay sold	8 90
Received from State	360 75
	$8,392 41

EXPENDITURES.

Secretary, for services	$25 00
Premiums	1,459 40
Hardware, etc.	115 19
Printing and stationery	266 38
Music, police, etc., for fair	649 83
Carried forward	$2,515 80

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Brought forward	$2,515 80
Lumber and labor	70 77
Water company's bill	8 00
Freight	12 00
Purchase money of new grounds	3,839 05
Town bonds in treasury	700 00
Balance of cash in treasury	1,246 79
	$8,392 41

HENRY ROSEBOOM,
President.

PUTNAM.

The annual meeting of the Putnam County Agricultural Society was held on the fourth day of January, 1871, at which the following officers were elected for the ensuing year: President, Anson M. Stratton, of Carmel; Secretary, James D. Little, of Carmel; Treasurer, Ambrose Ryder, of Carmel.

The crops for the year 1870 throughout the county were but little different, either in breadth or yield, to the ordinary seasons.

The milk business, *i. e.*, supplying New York city with milk, forms the chief or leading business of the farmers of the eastern section of the county. Throughout the middle and western parts considerable butter is made and marketed. But few cattle are now fattened; not really enough for home consumption.

The hay crop of 1870 was a full average. The breadth was larger, and is, by far, the leading crop of the county.

The corn crop was also very good, and the breadth moderate, as our farmers do not deem the cultivation of the crop profitable throughout the milk district, except where the condition of the land requires it to be plowed.

The oat crop was moderate, owing to the dry season. The breadth an average.

Rye and wheat about middling, but a very small breadth.

Potatoes a usual yield and less complaint of decay than usual.

No other crops worthy of note.

The annual fair of 1870 was held on the society's grounds in Carmel, and presented no features varying from the ordinary fairs for the last few years.

The address was delivered by Henry Bergh. The attendance and

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interest manifested in the fair was quite up to the usual mark, and was creditable.

TREASURER'S REPORT.

Receipts.

Balance on hand at annual meeting	$704 94
A. M. Stratton, life membership	15 00
J. E. Kelley, for rent	125 00
Proceeds of fair	2,199 30
State appropriation	92 62
	$3,136 86

Disbursements.

Premiums	$1,255 25
Repairs	13 42
Fair expenses	435 40
Other expenses	734 64
Band	85 00
Printing	202 00
Balance on hand	411 15
	$3,136 86

J. D. LITTLE,
Secretary.

QUEENS.

In presenting our report of the transactions of the Queens County Agricultural Society for the year 1870, it may not be out of place to refer to the raising of cattle and other stock, as an agricultural feature of the county, as well as such products as may seem desirable or profitable to each particular locality.

That portion of the county north of the Long Island railroad, especially that north of, and including the dividing ridge, presents a surface and soil peculiar to itself. From Newtown to Oyster Bay we find a series of hills and vales, a considerable portion of which, in consequence of the stones and boulders strewn so liberally over the surface, is found harder to cultivate than the level soil south of the hills; but the soil is good, and superior crops are raised, especially of fruit. The rapid growth of the yellow locust (Robinia Pseud-Acacia), proves the sub-soil of the dividing ridge to be of a superior character, and which seems to us well adapted to the cultiva-

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tion of the grape; certainly, equal to the most favored localities of Chemung, Steuben, and other western counties. We think the owners of land in the localities named, will find it to their profit to study the adaptation of their hilly soils to this product, for a south aspect presents itself through the entire breadth of the county, and is, undoubtedly, the best; a hillside is better than a plain. In the autumn, when the grapes are ripening, they will receive the greatest amount of heat the climate permits. Shelter, also, is important, retaining, as it does, the heat, which in the open plain is blown away by every wind. Such a location is equivalent to a latitude further south.

The northern portion of the county is proverbial for the sweetness of its pastures, and the abundance of its springs of pure water; and is said to be better adapted to the raising of short-horn cattle than any other part, with the exception of a few of the necks of land which stretch into the south side bays. The premiums awarded by the society for short-horn stock have mainly been carried off by competitors from Oyster Bay, North Hempstead, and Flushing; and more premiums have been awarded to the same towns for fruit, sheep, and some classes of vegetables.

The land south of the dividing ridge is more level, and easier tilled, it being a rare thing to find a stone as large as an hen's egg. Many a farm that a few years ago was not regarded as a paradise for the tiller of the soil, has, by the untiring energy of our enterprising farmers, been made to produce handsome crops of Indian corn and grain.

The land responds readily to any exertion made to increase its fertility. The farmers residing along the bays are greatly favored by the large quantities of rock-weed, eel-grass, and other products of the bays and ocean, which, when properly applied, have produced surprising results in the sandy soils of the south side, and many premiums have been awarded for crops of corn, potatoes, and grain, equal to any part of the State.

The South-side railroad has effected a great revolution in bringing up fertilizers at low rates of freight; and low rates of commutation have induced many former citizens of New York and Brooklyn to make permanent residences along its line. Forty years ago the land where Valley Stream depot now stands, could have been purchased for a mere song; and near the same spot we should have thought the land dear at twenty shillings per acre. Few counties in the State have greater railroad facilities than Queens; three roads are in actual completion, and another will shortly be in progress.

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In the southern portion of the county we think that the Ayrshire cattle will be found particularly adapted to the climate and feed. The cows are kind and docile, and unsurpassed for milkers as regards both quality and quantity of milk. On the islands off the coast of Massachusetts they have done remarkably well. We greatly regret that the severe rain storm on the last day of the fair prevented the sale of the fine herd of Ayrshires, which Mr. Crozier, of Beacon farm, had advertised to be sold at auction on the fair grounds.

The middle portion of the county, especially that part running from Queens to Farmingdale, including Mineola, Westbury, Hicksville, and the great Hempstead plains (the latter now being laid out by A. T. Stewart, of New York, for his "garden city"), according to the testimony of our most reliable medical authority, is the most healthy part of the county, and contains, among its inhabitants, a larger per centage of old people, in proportion to the population, than any other part; and it is also proverbial for its freedom from mosquitos and fever and ague. The soil is naturally under-drained, so that no stagnant water remains on the surface, but after percolating through a coarse gravelly sub-soil, supplies the wells with a crystal element as pure as nature can distil.

The western section of the county is mainly adapted to raising market truck; and the superior thrift of the residents, shown in their good horses, substantial homesteads, bank and other stocks, plainly demonstrates that large profits have been made in supplying the cities of New York and Brooklyn with a superior class of vegetables. A great change, however, is now taking place; the march of improvement is fast displacing our market gardeners, whose lands are turning into building lots; and they are willingly induced, by the large prices offered for their farms, to push their way east where cheaper lands can be obtained.

Much has been said about the importance of rearing a breed of faster horses than is now in general use by our farmers, and the owners of pleasure or carriage horses. No doubt there is room for improvement in this direction; and, so long as some animals can trot a mile inside of three minutes as easily as others can in double that time, then some reference should be had to speed by those who make breeding a business. It is useless, however, to prescribe one set of rules with the expectation that they will meet the wants of all classes. The demands of one class would not be that of another; therefore, the breeder who has an eye alone to speed would not find a purchaser in the one who needed muscle.

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The most profitable, as a whole, and best adapted to the wants of a majority on the island, is the horse of all work, combining, so far as is possible, all the good points of form, speed, muscle, and endurance. With men of experience and intelligence, breeding is no longer a matter of uncertainty; and it is nearly as easy to obtain and rear colts possessing all the desired qualities as it is those who have only one. Size, as well as form, is another desirable object; but we have yet to be convinced that the Clydesdale horses exhibited at our late fair, and weighing eighteen hundred pounds, would be as desirable as those weighing about a thousand pounds. As a general rule, it costs more to keep a large horse than a small one; and the one weighing from thirteen hundred to fifteen hundred will not perform as much labor, when the cost of keeping is considered, as the one weighing from nine hundred to a thousand pounds. Large horses may do very well for drawing heavy draughts at slow speed; but the concussion of bone and muscle, while traveling, is greater in a large horse than in a small one, and there is necessarily greater exhaustion. Taking the usual breed of horses raised in Queens county, we think they will compare very favorably with those from any part of the State.

During the past year our premiums on horses have been materially increased, by way of experiment; but the horses shown in competition, especially those for special premiums, have not realized the expectations of the society.

The matter of permitting professional breeders of stock, and raisers of fruit from other counties, to compete with our *amateur* exhibitors, needs revising, either by giving the former a sweepstake, or a special premium for articles raised out of the county. Our revised constitution permits the resident of any State becoming a member, with the right of exhibiting; but we think it should be in a different class from those residing in our own county.

The spring and fall exhibitions of the society have been eminently successful, our board meetings harmonious and well attended. The premium list needs revising and again increasing, especially as regards sheep, farm products, and the ladies' department.

The past season has been somewhat peculiar. The spring opened with every prospect of an abundant crop of grass and roots, and most other crops had a vigorous start; but a drought succeeded, accompanied with unusual heat, so as materially to check the growth of many plants, and particularly the after-grass in our fields, and the root-crops, so important as auxiliaries in the fall and winter feeding of stock.

Notwithstanding that the last day of the fall fair was extremely

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stormy, the rain falling in torrents nearly all the time, yet the attendance on the first two days resulted in pecuniary prosperity, and we have now become practically free from the indebtedness incurred in the erection of buildings and improvements of the grounds; and are prepared to enter upon a career of increased vigor and usefulness.

The twenty-ninth annual exhibition was held September 28th, 29th and 30th, 1870. The attendance on the two first days was good, but a severe rain-storm occurring on the third day prevented many from coming.

The amount of premiums was as follows:

Cattle	$359
Horses	657
Sheep and swine	145
Poultry	100
Articles for the table	56
Grain and vegetables	95
Implements	85
Fruit	202
Flowers	100
Other articles, about	250

The thanks of the society are tendered to the various committees of judges, also to the town committees and to the superintendents and assistants for their valuable services. Also to the Long Island Railroad for conveying articles to and from the grounds free of freight charges.

ANNUAL MEETING.

The annual meeting of the society was held at the fair grounds on Tuesday, November 22d. The President, Mr. Charles H. Jones, took the chair, and Charles Welling was chosen Recording Secretary.

The annual report was read by the secretary and treasurer; when, upon motion, it was

Resolved, That the secretary have 1,000 copies of the report printed.

The society's diploma and ten dollars were awarded to James Egan, South Oyster Bay, for the best crop of Indian corn, 106½ bushels to the acre.

RECLAIMING THE SALT MEADOWS.

The following statement, made by James Egan, of South Oyster Bay, proves that land hitherto considered worthless for tillage may, when in possession of an energetic and enterprising man, be made to

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produce important results; and there are thousands of acres of land lying on our south bays that are capable of producing similar crops. The captain does not make a pretence to an agricultural education, for his past years have mainly been employed in plowing the ocean, rather than the soil; but it shows what can be done with land hitherto deemed worthless for tillage.

Statement of James Egan respecting a crop of Indian corn raised on his farm at South Oyster Bay:

SOUTH OYSTER BAY, *Nov.* 21, 1870.

The land on which the crop of corn was raised is a part of twenty acres of land which, two years ago, was black grass, salt and fresh meadow, and one year ago was covered by the tide, on account of part of the dyke giving way during a heavy storm. The land has been ditched about seven feet wide and three feet deep; the material thrown out forming a dyke or bank, with two self-acting gates, which keep the tide out at high water, and allow the drainage water to pass out when the tide has fallen. Five acres of this land was plowed last fall, and well harrowed the past spring. Marked out three feet nine inches each way, and manured in the hill, with four two-horse wagon loads of New York horse manure to the acre. Commenced planting first week in May, with eight-rowed yellow corn. The corn came up in about two weeks; four or five spears were left in the hill. The land was entirely worked by Ross' patent cultivator and hiller, which saved the expense of hoeing, and was only twice worked; it was quite free from weeds.

The corn was cut up the beginning of October, and finished husking November 19th. One acre was surveyed by a sworn surveyor. The corn was measured into a one-and-half-bushel basket, which made two hundred and one bushels of ears. The whole of the corn was weighed, and there were seven thousand four hundred and thirty-seven pounds (7,437). We then shelled two baskets, and the shelled corn weighed eighty-nine (89) pounds, which makes one hundred and six and a half (106½) bushels, at fifty-six pounds per bushel, to the acre. The yield of the lot was about four hundred and ninety bushels.

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VALUE OF CROP—ONE ACRE.

By 106½ bushels of corn, at $1.00		$106 50
By 350 sheaves of stalks, at $3.50		12 25
		$118 75

EXPENSES.

To plowing	$3 00	
harrowing and marking	1 50	
carting and planting	4 00	
seed corn	25	
cultivating	2 00	
harvesting	6 00	
manure	18 64	
interest on land	3 00	
		38 39
		$80 36

JAMES EGAN.

The proposition made at the last annual meeting to amend article ten of the constitution by stiking out the word "ten," and inserting the words "twenty-five" dollars to become a life-member, was taken up and discussed; and on a vote being taken, it was declared carried.

The election of officers for the ensuing year was then in order, and the following gentlemen were unanimously re-elected: President, Charles H. Jones, of Cold Spring; Vice-President, Charles D. Leverich, of Newtown; Secretary and Treasurer, John Harold, of Hempstead.

TREASURER'S REPORT, 1870.

John Harold, Treasurer, in account with Queens County Agricultural Society:

Receipts.

Balance on hand		$342 22
Rent of grounds and buildings		980 85
Donations, etc.		42 00
Entrance fees and carriage tickets		3,622 73
Life and annual members:		
Hempstead	$620	
Oyster Bay	543	
North Hempstead	456	
Jamaica	252	
Flushing	205	
Newtown	55	
Out of the county	227	
		2,358 00
State Treasurer		221 81
		$7,567 61

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Expenditures.

Premiums and expenditures at horticultural show	$310 98
Liquidation of debt and interest	1,587 50
General construction	53 40
Fair expenses	1,689 54
Premiums at fall fair	2,021 25
Printing and stationery	136 07
Contingent expenses	613 22
Balance on hand	1,155 65
	$7,567 61

The debts of the society have all been liquidated.

JOHN HAROLD,
Secretary and Treasurer.

RENSSELAER.

The twenty-seventh annual fair of the Rensselaer County Agricultural Society was held on the grounds of the society, in the village of Lansingburgh, on the 26th, 27th, 28th, 29th, and 30th September last; and the exhibition, we take pleasure in saying, was creditable alike to the society and county, and more than equaled our most sanguine expectations. For this auspicious result we are largely indebted to the personal efforts of our treasurer, George A. Waters, whose motto was, the load shall move, or the harness break. Too much cannot be said, by way of commendation, for the ability and fidelity with which he discharged his official duties.

The burning of floral hall, the central and best building of our society, in the autumn of 1869, and to which reference was made in our last annual report, was a greater loss to us, in a pecuniary point of view, than we at first supposed. Still, in the end, it may prove to be to us a blessing in disguise, for the site of our old building is now covered by a new one much larger, far more imposing in its general appearance, and much better adapted to the purposes of an agricultural fair. The cost of the new building will not vary much from $6,000.

Our financial condition, as will be seen by a reference to the treasurer's report, which is here subjoined, though greatly improved from what it was a year ago, is not all that we had hoped, and certainly not all that it would have been, had the weather continued as favorable to the end of the fair as it was at the beginning. The severe

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rain storm which occurred on the last day of our exhibition, though a great blessing to the county at large, was quite disastrous to the receipts of our society. Still our treasury has been fairly replenished, and our hopes animated, so that we enter upon the work of another year with courage, and with a zeal commensurate with the work we have to perform.

TREASURER'S REPORT.

Receipts.

On hand per last report	$277 13
Sale of tickets at fair	3,950 25
Bills receivable (loan called in)	2,060 98
Permits and privileges at fair	620 19
Percentage on special premiums	155 00
Advertising in premium list	85 00
State appropriation	438 75
Rent of buildings	300 00
	$7,887 30

Expenditures.

Sundry payments by S. K. Stow, treasurer	$100 50
Expense account at fair	1,013 18
Insurance	203 75
Advertising	1,016 22
Labor account at fair	457 65
Account, buildings and repairs	2,912 83
For premiums	1,007 00
For salaries	500 00
On hand	676 17
	$7,887 30

The premiums offered by our society for trotting horses were liberal in the extreme; and our only regret is, that the premiums which were mainly designed for horses owned in the county, were taken from it by itinerants. This we look upon as an evil without the hope of abatement; a chronic disease that, after long doctoring, is found to be incurable; a complicated ailment on which the doctors have never ventured to give us their diagnosis. Our only hope is, that, like most of the ills that flesh is heir to, the evil may possibly cure itself; though inexorably opposed to itinerants, or to the introduction of horses, "without a habitation or a name," to carry off our largest premiums, we are not opposed to trials of speed for country horses, when competing for premiums; for speed, more than any other attribute or quality, now determins the *value* of the horse.

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Of cattle, there was only a fair show; fat cattle taking precedence of all others. Next year we must have a better display. Our determination and courage, we verily believe, are equal to the emergency.

Our annual address was delivered by Thomas B. Carroll, Esq.; and though an able and an instructive production, the loud talking and boisterous mirth of the people, mingled with the deep murmur of ten thousand footsteps around the speaker's stand during its delivery, was too much for his capacity of voice. Finally, after having made several ineffectual attempts to gain the attention of the multitude, he gave up in despair. He then gracefully folded up his manuscript, and with true gentlemanly dignity and a smiling face, joined the vast assembly in their free and easy promenade around the grounds. He should have closed his address with *volo, non valeo;* I am willing, but unable.

The hay crop, though not a failure, was, nevertheless, quite limited, owing to the protracted drought which prevailed to an unusual extent here and throughout most of the eastern and western States. Corn was much better than in 1869; and the potato crop, a crop of great value to the counties of Rensselaer, Saratoga, and Washington, was fair in quantity, though inferior (we speak from experience) in quality. Of oats and winter grain there was a respectable, though not an abundant yield.

The annual election of our society occurred on the seventeenth of January, and the following were elected officers for the present year: President, James R. Fonda; Secretary, S. K. Stow; Treasurer, Geo. A. Waters.

S. K. STOW,
Secretary

RICHMOND.

The past year, in a financial point of view, at least, was not a very prosperous one, owing to the extremely unpleasant weather attending the first three days of our annual fair. The last, however, was fine, and the fair grounds crowded, and had the others been likewise, I doubt not we should have had a handsome balance, instead of a deficiency of $106 to carry over to the coming season. Somewhat discouraging, of course, after all the trouble we had taken with it; but it simply illustrates the fact that every agricultural society should have a reserve fund of a thousand or two dollars, to provide for just such contingencies.

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1871 opens promisingly. A good feeling prevails. The club grounds, where we hold our fairs, have passed under new and progressive management, and the matter of erecting a grand stand and exhibition building is being acted upon, thereby doing away with the annual expense of tents, etc., and contributing much to the comfort of visitors. The stand will also be a source of income during fair times, and these, with other projected improvements, will facilitate our labors, and, we hope, add to our success.

The society, in addition to the usual fall fair, held a spring exhibition, a practice which was inaugurated last year, and has been deemed worthy of continuance, from the fact that it affords opportunity for the display of many articles in the line of early vegetables, fruits, flowers, etc., which could not otherwise be exhibited.

This exhibition was held on the 16th and 17th of June, in a tent on the fair grounds, and brought forth a handsome display of strawberries (prominent among which were the Jucunda, Triomphe, Agriculturist, and Wilson's Seedling varieties), some gooseberries, currants, etc., early potatoes (some of which would have done credit to a fall exhibition), a fine variety of early vegetables, and a handsome display of flowers, ornamental foliage plants, etc. Trotting each afternoon completed the programme.

The annual fall fair was held on the 5th, 6th, 7th and 8th of October. As before mentioned, the extremely disagreeable weather of the first three days was quite a blight to our prospects, and the attendance was light. Saturday, however, opened brilliantly. The grounds were crowded, and the large attendance in a measure repaid us for the disappointments of the other three. The exhibition of agricultural products, fruits, manufactured articles, and poultry, was held in two large tents on the race-course, in the rear of which were erected sheds for horses, cattle and swine. Of agricultural products, fruits, etc., the display was good, and the comparatively small number of exhibitors was noticeable (a feature, however, not peculiar to this fair). The quantity, quality, and variety of articles compared favorably with previous exhibitions. Of horses, the fine studs of Dr. Carnochan, Mr. Thomas Sampson, and Mr. J. S. Underhill, were particularly noticeable. The cattle show was only fair; that of hogs fine, embracing one from the Seamen's Retreat, weighing some 800 pounds. Trotting each afternoon, and the annual address, completed the programme.

Hon. A. Oakey Hall, mayor of the city of New York, delivered the annual address in the exhibition tent, his honor humorously

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declining to speak from a rather shaky-looking stand which had been improvised on saw-benches, on the plea that, coming there as an agriculturist, and not as a politician, the *ground* was more appropriate than a *platform*. He continued in the witty and eloquent style for which his Honor is famed; and the address was certainly one of the most brilliant that the society has ever been favored with.

Considerable comment has been made on the matter of horse-racing at agricultural fairs, by various individuals, reflecting not merely on the institution itself, but in a greater or less degree on the societies who permit it. Now, with all due deference to the views of these gentlemen, we must reserve to ourselves the privilege of determining as to the propriety and advisability of permitting it at our fairs. Our experience has been, that, for one who would come to see simply an exhibition of agricultural products, there are a dozen who come with the additional incentive and attraction offered by the racing; and, certainly, a considerable portion of our agricultural premiums and expenses are paid out of funds derived from this source. Apart from this, we fail to perceive anything worse in competition in point of speed than in any other particular, or how, as here conducted, it is either a "deleterious practice" or "out of place."

His Honor, Mayor Hall, in his remarks, referred back to the time when there was an agricultural society in New York county (Manhattan island), and the same process which forced that to succumb to the march of improvements is slowly, yet just as surely, making its inroads on ours. Our farms are being cut up into villa plots, and these, as they fill up the shore, are creeping back into the country. Richmond is not, to-day, an agricultural county. Our lands are fast becoming too valuable to farm, and but a few years and gardens and greenhouses will be all that we shall have left.

At the annual meeting, on February 25th, 1871, the following officers were elected: Samuel Barton, President; Eugene Britton, Treasurer; William W. Kellett, Recording Secretary; Henry T. Metcalfe, Corresponding Secretary.

TREASURER'S REPORT.

Receipts.

Balance from 1869	$25 37
Proceeds of June fair	120 65
fall fair	503 10
trotting match	61 00
State appropriation	82 88
Carried forward	$793 00

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Brought forward	$793 00
Sale of season tickets	435 00
Premiums donated	202 00
Sale of lumber	115 82
Deficit (balance due on lumber bill)	106 37
	$1,652 19

Expenditures.

Printing	$247 84
Premiums	485 00
Help	108 12
Bill-posting	43 00
Meals for help	93 00
Transportation	42 70
Hire of tents	130 00
Music	176 00
Feed	36 88
Lumber and fixtures	289 65
	$1,652 19

WM. W. KELLETT,
Secretary.

ROCKLAND.

The annual fair of the Rockland County Agricultural Society was held on the fair grounds, New City, October 5th and 6th, 1870.

The show of agricultural products and implements, cattle, horses, fruit and flowers, was the finest ever exhibited at any previous fair held by our society; and it would be unjust to the fair ladies of our county to neglect to state that the ladies' department was as truly worthy of remark as the other departments of our exhibition.

An increased interest has been felt in our last exhibition, owing somewhat, doubtless, to the large premiums offered, being nearly double those of any previous fair.

The following is a statement of receipts and expenditures:

RECEIPTS.

Balance in hands of treasurer	$61 52
Amount received from State	87 75
Voluntary subscriptions received	213 00
Gateage and entrance fees	818 78
Balance in hand	15 52
	$1,196 57

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EXPENDITURES.

Premiums awarded and paid	$876 75
Paid secretaries and assistant treasurers	37 00
Printing bills	69 75
Lumber for repairing fair grounds	72 07
Repairing fences and track	91 00
Paid T. L. DeNoyelles for taking care of and putting up tents two years	50 00
	$1,196 57

The following are the names of officers elected for the ensuing year: President, Isaac Pye, of Nyack Turnpike; Recording Secretary, Samuel Russell, of Clarkstown; Corresponding Secretary, Spencer Wood, of Clarkstown; Treasurer, Abram A. Demarest, of Clarkstown.

ISAAC E. HOUSE,
Secretary.

ST. LAWRENCE.

The nineteenth annual fair was held on the grounds of the society at Canton, on 20th, 21st, and 22d days of September last. The show of stock, as usual, was very creditable, and indicates that the farmers of the county are taking more interest in the better breeds of cattle, more especially of the Short-horn and Ayrshire. Of horses, the show was large, but I do not think the quality and style was what the county of St. Lawrence ought to show; that is to say, I think this county ought to show more and better matched horses than it does. Of sheep, the show was not unusually large, but was very good as to quality. I notice quite an increase in South Downs as well as Leicesters. The show of swine was also very good and fine; Suffolk, Chester White, and Berkshire were the prominent kinds. Of mechanics' work and farm implements, the show has never been excelled. The society the past year increased the premiums about sixty per cent, which brought out a large exhibition; and the weather being fine, the fair was unusually well attended, and everything passed off very satisfactorily.

The season has been dry and the hay crop light, although of good quality. I reported to the Agricultural Bureau at Washington, seven-tenths of a crop. The straw and corn fodder also are light, but of a superior quality. This, with the large number of cattle sold and

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driven off since the middle of August, will leave sufficient fodder to carry the stock through the winter; and unless the price of hay comes down from twenty dollars, as it is now, there will be in this town a number of barns that will summer over from twenty to fifty tons, as they have the past summer. The wheat and oat crop I judge to be about three quarters of an average crop, also of a good quality of berry; of barley there was not much sown and is a light yield. The potato crop, from the best information I can get, is a full average and of good quality. The other fodder crops, like turnips and mangolds, are light from the extreme drought and great ravages of the fly.

TREASURER'S REPORT.

Receipts.

Balance on hand as per last report	$1,752 70
State appropriation	414 38
Members' tickets at annual meeting	70 00
Entries	195 00
H. N. Redway, annual donation	5 00
E. Miner	46 91
Tickets and checks	3,890 54
	$6,374 53

Disbursements.

Premiums	$2,803 50
Printing	331 50
Buildings and improvements	952 10
Fair expenses	273 55
Salaries	169 00
Other expenses	150 48
Cash on hand	1,694 40
	$6,374 53

GEORGE ROBINSON,
Secretary.

SARATOGA.

The Saratoga County Agricultural Society is still moving on in its efforts to promote a love of agriculture for its own sake; to show to the youth of the county that it is no *mean* thing to be a tiller of the soil; to incite farmers to magnify their calling; as well as to give to all classes of the community a few days of enjoyment at the annual exhibitions. The board of managers is composed, as it should be,

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almost entirely of *practical* men, men who *love* to be called *farmers*, and who are not now ashamed themselves to hold the plow, or swing the axe or scythe, who have grown up in the pure atmosphere of the fields.

At the first session of the board, held at Saratoga Springs, May 30, 1870, twenty-eight members responded to their names. A resolution was adopted, that the annual fairs and cattle shows of the society be located to be held on the society's grounds in the town of Saratoga Springs during the next five years; and that the next fair should be held September 6, 7, 8, 9, 1870. Warren H. Waring was appointed general superintendent for the year. The president was authorized to secure a speaker to deliver the annual address.

The premium list of 1869 (amounting to $1,700, in all classes) was adopted for 1870; 160 volumes of Transactions were included in the list, mostly as third premiums. Vacancies in the board were filled; and, after transacting some further business of minor importance, the board adjourned.

At the session of August 6th, twenty-five members were present. Committees were appointed to attend to printing; to repairs on fair ground; to arrange for agricultural discussions during the fair, etc. Premiums were offered, amounting to eighty dollars, to be awarded only to animals that have heretofore taken first premiums at fairs of this society, and are now debarred from competing for ordinary premiums.

The board held daily sessions during the fair, for the purpose of keeping a close oversight of all matters that would affect the interests of the society. The entries commenced at an early hour of Tuesday, September 6th, and continued, with little intermission, till 11 o'clock A. M. of Wednesday. The total number of entries, in all classes, was 927.

On Wednesday morning our energetic and worthy secretary, Mr. J. S. Howland, was seized with hemorrhage of the lungs, and obliged to leave the grounds, being able afterwards to give only some slight verbal directions as to his plans for the conduct of his work. His labors for several days previous were severe; and his anxiety and efforts to make this exhibition a marked success are looked upon as a prominent cause of his prostration at this time. After suffering till Saturday, November 12, he was released from the labors of earth. Besides the loss of Mr. Howland, this society has to mourn the death of Mr. Oscar Granger, long an earnest worker and an honored officer in the society, and also a worthy member of the State Society. The action of the

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board of managers in relation to the death of both these members will be given hereafter, in its appropriate place.

The Daily Saratogian of September 9th says: "We speak the unanimous opinion of all, when we say the present is by far the best fair ever held in this county. Every department, with two or three exceptions, is first-class, and the managers have great reason to congratulate themselves on the fine exhibition made by our leading farmers. Where there is so much that is meritorious, it is difficult to particularize; but we cannot forbear speaking of the great quantity and superior quality of the seed-corn on exhibition. We do not think there has been so much good corn shown, altogether, in the past five years, as there is this year. [There were twenty-six entries of seed-corn.—SEC'Y.] The committee, to award the premiums, must have had a very difficult job to make their decisions. The show of rye, wheat, oats and buckwheat is also very good, and creditable to the county. In garden vegetables there are good assortments, all meritorious. Butter and cheese are very light, there being only two entries of each."

At 12 o'clock on Wednesday the judges commenced their labors, and attempted to decide the merits of competing entries.

On Thursday, the day being fine, a large number of persons visited the grounds, many of whom, it is to be hoped, profited by the address of Mr. X. A. Willard, of Herkimer.

The Saratogian gives the following sketch of the address:

"Mr. Willard is a gentleman of prepossessing appearance, and his address was greatly liked by all who heard it. It was full of excellent suggestions, and very gracefully and forcibly written. He began by remarking that our harvests this year are largely in excess of consumptive demand, while abroad, in England, they will fall at least one-third below the average. On the continent they are now reaping a harvest of blood and carnage, and famine and destitution stalk abroad. He spoke of the blessings of peace, and remarked the singular fact that, during our own great war, bountiful crops rewarded the labors of the husbandman.

"Mr. Willard said he should not attempt any splendid theories, nor assume to point out a short way to wealth; but he was the advocate of a plain, practical system of farming. Public discussion is desirable, for it stimulates men to *think;* and agriculturists are not apt to do so much of this as is desirable. The mass of farmers, he thought, endeavor to farm too much land. There is no objection to large farms, if each acre is made to yield as much as possible.

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"The themes which should engross the attention of the farmer are such as the removal of surplus water by drainage; the increase of his root crops; the improvement of his stock; the renovation of the soil; the husbanding of manures; the selection of the best seeds, and improved implements. This is the true path to success. If the farmer has not time for this, then he should cultivate less land. He who half farms his land practically loses the use of every other acre, while taxed for fencing and the interest of its value. The American greed for land is a great mistake, when indulged to the neglect of good cultivation. The victim carries the burden from year to year, until broken health or death puts an end to the struggle.

"Mr. Willard showed the value of intelligent farming by stating that one dairyman, with twenty-five cows, will produce as much cheese as another with fifty cows, with half the capital and less labor, thus doubling the profits, while having more leisure and enjoying more of the luxuries of life. He also dilated upon the advantages of ready pay, as an element of success.

"The proper education of farmers' sons and daughters was advocated at some length. Farming is now largely a drudgery, where it might be made a pleasure by a scientific understanding of the soil. He recommended prizes, not only for the production of choice animals and articles, but for the best manner of producing them. If one man can produce 100 bushels of corn as easily as another can fifty, that is something which all have an interest in knowing.

"It is a mistake for the children of the farmer to look down on farming. There is no other business which yields so certain a reward. Only five in a hundred succeed in mercantile life.

"Agricultural schools and colleges are necessary, and such as will give their pupils practical experience in the field. And it is equally important that farmers' daughters should be properly educated as well as their sons, that they may make good farmers' wives. The comments of the speaker on this point were quite telling, and elicited a round of applause.

"The proper application of manures is a subject of vital interest to the farmer. The question is, what will supply the food best adapted to particular plants. A large percentage of the manure applied is practically lost, because it does not supply the ingredients needed for the particular crop. The argument of the speaker on this subject was highly scientific and very suggestive.

"Sometimes a particular line succeeds greatly in some locality. A single dairyman in Herkimer became rich before his neighbors discov-

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ered his secret. *Now*, the dairy herds cover all the hills in that region.

"Greater attention to fruit was recommended. It is healthy, and its culture may be made profitable. The orchards, in large sections, are now dying out for want of culture.

"In conclusion, the speaker recommended thought, order, system, as indispensable aids to successful farming. The man who lacks them is always behind-hand, and never has leisure; while he who does everything at the right time is never hurried, and easily accomplishes the work of two or three ordinary men. The former leaves his tools scattered, neglects the weeds, and permits the gap in the fence to exist until his crops are destroyed by his neighbor's cattle. The latter avoids all this, and success crowns his labors."

The above is but a faint outline of a portion of the topics discussed in this admirable address. Mr. Willard showed himself master of his subject, and one of the most graceful as well as interesting of agricultural speakers.

On Thursday evening, September 8th, a few gentlemen assembled at Hathorn's village hall to consider the question appointed for discussion, viz., "What is the best method for making and utilizing manures?" J. P. Conkling, appointed to open the subject, said he had but little practical experience on this subject, but he would reiterate some of his remarks of former years.

He thought farmers were honest, as a general thing, with everybody except themselves and their farms. They did not return to the land a recompense for what they took away in crops. He gave his ideas in relation to construction of barns and barn-yards. He also related anecdotes of use of various articles as manures. He said sand from roads would be beneficial on many soils. Hon. D. C. Hoyt had told him how he found sand taken from under a barn, apparently no different from the sand outside, to prove very beneficial on a crop of buckwheat. He advised saving soapsuds and making cess-pools to save manures thrown away by every family. He spoke of benefit of ashes; also of the ruinous effect of selling straw off the farm without returning the value in fertilizers. A farmer who will only take pains to save all the manure of every kind made on his farm, will not be obliged to go abroad to purchase. He will make all he wants. If merchants, business men, and professional men were as shiftless and wasteful as most farmers were in the matter of saving and using manures, they would be sure to fail.

S. P. Briggs, appointed to take part in the discussions, professed

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himself rather a novice, but gave some general ideas on the subject. He recommended the use of earth closets; and said, if dry earth was not convenient to be used, coal or other ashes would be a good substitute.

J. M. Gailor said the subject of making and utilizing manures was inexhaustible. With the diversity of soils we require a variety of manures, and the experience of each would be different in a measure. He had found that a practice which proved beneficial one year with summer crops, was not so in another year on sandy soils. With winter crops the case is different, and he would recommend spreading on the manure after sowing. In regard to special manures, his experience was that guano and bone dust cost too much to pay for their use; but salt and plaster mixed together had proved highly beneficial and profitable in a single case.

F. D. Curtis had experimented a great deal with manures, but he was quite unsettled in his opinions on most points. He was fully convinced of the value of muck, which he recommended to have dug out and exposed to the atmosphere for some months, then mixed with lime; was opposed to the mixture of ashes with hen manure as wasteful; regarding the use of ashes, he said he knew of a place where ashes were put nearly fifty years ago, which still showed the effects; the nearer manure is applied to the roots of plants the better.

J. M. Gailor found muck of great value as an absorbent in his barnyard, and it was of more value after lying through the winter in the yard than the manure from his cattle.

On Friday, the 9th, the fourth day of the fair, there was little abatement of interest. The continued pleasant weather was exceedingly beneficial to the society, as no more favorable time for the exhibition could have been selected. The judges having completed their awards, and the reports being written up, were read from the stand at two o'clock, P. M. After the reading of the awards the executive board met, and added to the list a diploma of the society to J. Cornell & Co., of Sandy Hill, for turbine water wheel; and to James Vick, of Rochester, for display of flowers. Mr. Oscar Granger was, by vote of the society, made an honorary officer for the ensuing year, in recognition of past services to the society.

On the 26th of October, the secretary, Mr. J. S. Howland, resigned his office, and the president immediately appointed Benjamin S. Robinson, of Greenfield Centre, to hold for the unexpired term. On the 12th of December the stated session of the board of managers was held at Saratoga Springs, seventeen members being present.

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A committee on resolutions was appointed and reported the following:

"*Resolved*, That this society would hereby express their profound respect for their late secretary, Jonathan S. Howland, who, by his faithfulness in the discharge of his official duties, and his able and excellent qualities of mind and heart, won our regard, while they cause us to be sincere mourners with his friends in their sorrowful bereavement.

"*Resolved*, That in the death of the late Oscar Granger, this society has lost one of its oldest and most efficient members, who was ever active and earnest to promote its interests and welfare, and that we cordially sympathize with his family in their great loss.

"*Resolved*, That the secretary be instructed to transmit a copy of these resolutions to the families of the deceased, and to record the same upon the minutes of this society."

These resolutions were unanimously adopted.

A committee of seven was appointed to devise ways and means to liquidate the indebtedness of the society; and were instructed to procure, if possible, the passage of a law, authorizing the board of supervisors to levy a tax upon the county to pay the indebtedness of the society, and to purchase the property now owned by the society; the same to be held by the board of supervisors as the property of the people of the county of Saratoga; the agricultural society to have the free use of the same to hold their annual fairs; and the property to revert to the county whenever the society shall be dissolved, or shall cease to use the same as an agricultural society, according to the provisions of the act; and that should the committee fail to procure the enactment of such a law, they should endeavor to get authority to mortgage the lands now owned.

The following are the officers of the society for the year 1871: President, John P. Conkling, of Saratoga Springs; Recording Secretary, Benj. S. Robinson, of Greenfield Centre; Treasurer, Milo J. Jennings, of Saratoga Springs.

RECEIPTS.

Balance from 1869	$119 34
Tickets sold	1,345 86
Annual memberships	632 00
Superintendent	235 00
Shows	47 00
Secretary	15 00
Gate keepers	38 85
State appropriation	294 94
Proceeds of society's note	639 93
One life-membership	10 00
	$3,377 92

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DISBURSEMENTS.

Premiums	$1,067 74
Labor bills	329 25
Clerk hire	122 50
Police	55 00
Horse trotting	125 00
Miscellaneous bills	403 37
Notes and interest paid	1,087 00
Balance	188 06
	$3,377 92

B. S. ROBINSON,
Secretary

SCHENECTADY.

The regular annual meeting of the Schenectady County Agricultural Society was held January 18, 1870, and the following officers elected for the year: President, Charles Stanford; Treasurer, James W. Mairs; Secretary, E. Nott Schermerhorn, Schenectady.

On motion, the time for holding the annual fair was fixed September 13, 14, 15 and 16, 1870.

TREASURER'S REPORT.

Receipts.

Balance from last year	$187 17
Advertisements	100 00
Tickets sold at the the gate	1,101 32
Yearly members	220 50
Special premiums	27 50
Licenses	193 50
President Stanford	758 18
Amount due treasurer, J. W. Mairs	60 19
	$2,648 36

Disbursements.

Premiums	$757 00
Fair expenses	282 19
Improvements and repairs	1,314 24
Printing	266 25
Miscellaneous	28 68
	$2,648 36

E. NOTT SCHERMERHORN,
Secretary.

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SCHOHARIE.

The ninth annual fair of the Schoharie County Agricultural Society was held on the society's grounds at Schoharie, October 4th, 5th and 6th, 1870. Last year the fair was preceded by a freshet, disastrous in its results. This year it was preceded by a storm, and the days on which the fair was held the weather was anything but propitious. There is no doubt that the threatening state of the weather kept many people from attending the fair. Notwithstanding this fact, the number of entries was larger than any previous fair, and the receipts larger than at any time since the existence of the society.

The institution is out of debt, with a balance on the right side of the ledger. If well sustained by all who should be its friends, its successful permanency will be put beyond a question. Our county may well be proud of the excellent horses she furnishes for her use and for market. The number on exhibition shows a falling off from last year, yet in quality an evident advance has been made. The unfavorable weather, doubtless, had much to do in producing this result, not only in the department of horses, but in probably all the departments named in our list. There was a good show of sheep, swine and fowls.

Would you learn where progress is made more apparent, see the domestic department. The entries exceed those of last year, and no year had equaled the last in that department. Agricultural hall was loaded with material furnished by ladies of our society, from the beautiful and substantial carpet, fulled cloth, flannels, linen, and the numberless indispensable articles for family use, including the useful and ornamental, to the cake tidy and lady's pincushion.

The extensive exhibition of the choicest varieties of vegetables, garden and field, gave evidence of improvement and increasing interest in this department.

Great credit is due to the various amateurs, who furnished floral hall with its choicest selection of fruits, apples, pears, plums and grapes in rich abundance. Flowers as varied as our soil and climate, with the choicest care and culture will produce, in the varied forms that taste can suggest. Pictures in endless variety, portraits, oil paintings, crayon drawings, photographs, each tastefully arranged upon fixtures prepared for that purpose. Among these we would mention a fine painting, "Fairy Land." This was a very pretty thing; as the work of an amateur, it was certainly first-class; in fact it was a painting of merit, and reflected great credit upon the lady artist, Mrs. James O. Williams.

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Messrs. Winter & Stafford made an attractive exhibition of carriages, sleighs, cutters, etc. In the hall were also a number of articles entitled to mention, and for the production and exhibition of which the exhibitors are entitled to thanks.

The following is an account of receipts and disbursements by the treasurer for the year 1870:

RECEIPTS.

Sale of tickets at gate	$250 22
Grass sold from grounds	62 25
Members tickets and entries for the fair	258 00
Sale of tickets at office	547 75
For refreshment stand	89 75
Spectators stand	22 50
Sale of tickets at office	343 92
Received at spectators stand	22 90
Entrance money for State trot	40 00
State appropriation for 1870	236 44
Cash from other sources	51 92
	$1,925 65

DISBURSEMENTS.

Premiums paid for trotting	$150 00
Premiums awarded at fair	744 00
Paid rent of grounds	140 00
Paid indebtedness of previous year	114 69
Printing and incidental expenses	412 90
Balance in treasury	364 06
	$1,925 65

The annual election was held on the first Monday of May. The present officers are Charles Bouck, Fultonham, President; M. N. DeNoyelles, Schoharie, Treasurer; Isaac C. Van Tuyl, Schoharie, Secretary.

ISAAC C. VAN TUYL,
Secretary.

SCHUYLER.

The summer exhibition was held July 4th and 5th, under very unfavorable circumstances.

With receipts of	$277 90
And disbursements, premiums, and expenses	272 40
Balance in treasury	$5 50

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The annual exhibition was advertised for September 29th, 30th, and October 1st, 1870. The usual good fortune of the society in regard to weather was hardly apparent on this occasion. The dull, leaden clouds, and a downright rain storm, was sufficient to warrant an adjournment to October 13th, 14th, and 15th, 1870. It is gratifying to be able to state, however, that in spite of these adverse circumstances the gross receipts were large; an evidence of substantial and enduring prosperity.

The ex-treasurer makes the following report:

He received from all sources	$1,812 68
And paid for all purposes	1,810 80
Leaving a balance on hand of	$1 88

The annual meeting was held at the Jefferson House, in the village of Watkins, on Saturday, January 28th, 1871, when the following officers were elected for the ensuing year: President, Col. E. C. Frost, of Watkins; Treasurer, John M. Smelzer, of Watkins; Secretary, E. C. Robbins, of Watkins.

E. C. ROBBINS,
Secretary.

SENECA.

The Seneca County Agricultural Society held its annual fair at Waterloo, October 4th, 5th, 6th, and 7th, 1870, having been extended over one day longer than was originally intended and advertised, on account of a cold drizzling rain, which continued for the first two days; the last day of the fair being the only one that was really fine for the purposes of such an exhibition.

Owing to the unfavorable state of the weather and roads, the attendance of exhibitors and spectators was not as large as could have been desired, or as is customary in our county. Still, all things considered, we did very well; the total number of entries being four hundred and sixty-two, of which, eighty-eight were in the various classes of horses, seventy in cattle, but two in sheep, and six in swine; implements and machinery, twenty-three; bedding and household products, forty-five; embroidery and fancy work, thirty-eight; miscellaneous and discretionary, sixty-nine.

The horses made a fine display of very choice animals; and the various classes of blooded and grade cattle were filled by the finest stock of some of our best breeders. The miserable weather

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kept back the sheep and swine; otherwise, the display in these classes would have been large and good. Those exhibited were very fine of their kind. There was a good display of agricultural machinery and implements; and the floral tent was well filled with fine specimens of fruit, flowers, etc., household and domestic products, and miscellaneous articles, all tastefully arranged, and making a show creditable alike to the industry and skill of the exhibitors and producers.

On the afternoon of the third day, G. Wilcoxen, Esq., of Seneca Falls, delivered in front of the floral tent a very able and instructive address, which was listened to with much interest by those present, and for which the thanks of the society were unanimously voted. A feature of this day's exhibition was the sale at auction, on the fair grounds, of the blooded cattle of J. E. Ashcroft, of Seneca Falls, which we hail as the inauguration of a system, that if properly carried out, cannot fail of proving an additional attraction to the interest and usefulness of our agricultural fairs, and of great value to farmers generally.

The last day was devoted to trials of speed of horses, which brought out a good attendance, and a good display of fast horses. The award of premiums was made on the afternoon of this day.

The receipts and payments the past year, since date of last report, are as follows:

TREASURER'S REPORT.

Receipts.

Balance on hand as per last report	$295 94
Members' tickets	460 00
Carriage tickets	453 59
Exhibitions on the grounds and rent of saloon	71 00
Seats	31 77
Trotting entrances	64 00
Iron sold after the fair	6 30
C. Hoskins, premium returned	1 00
State appropriation	180 37
	$1,563 97

Payments.

At the winter meeting, and since, up to the time of the fair,	$87 00
Premiums	319 10
Trotting premiums	186 00
Fair expenses	547 00
Printing	98 00
Balance in treasurer's hands	326 87
	$1,563 97

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The past season has been very dry, and crops generally have not been as good as usual, but there have been no drawbacks from wet or unfavorable harvest weather, or disease in cattle, or root crops.

The details of the various crops raised will be as follows: Wheat, a fair crop, of good quality, though much injured by smut in some localities, varying from fifteen to twenty-five bushels per acre, weighing sixty pounds and upward, per bushel. Wicks and Mediterranean the chief varieties, with some little Diehl, which latter has been more extensively sown this fall, owing to reports of yields of thirty-five to forty bushels, per acre, which must, however, be taken as exceptional cases. It is believed, nevertheless, to be a good variety, both for yield and quality, requiring stronger soil than the other kinds more generally grown. There was also a good deal of the Treadwell variety sown this fall for like reasons. Barley and oats both light crops, and much under our usual average. The former about fifteen bushels, per acre, and the latter twenty-five to thirty bushels. Hay, generally light. Corn in the south half of the county a light crop, may average twenty to twenty-five bushels, shelled, per acre. In the north half, with some few exceptions, a very excellent crop, and fully up to our general average. Potatoes, also, generally a full crop in the north end of the county, and not so full in the south, but quality good, with some little rot on late varieties in heavy soils. Roots not much cultivated, but a fair crop where grown; some good samples of beets exhibited at fair. Clover seed filled pretty well, of good quality, and a great deal of ground harvested. Buckwheat a tolerable crop. Fruits of all kinds generally very good. Grapes very abundant, and fully ripened before frost; and the apple crop the largest we have had for years, and quality very fine. The autumn was one of the finest ever known, with pleasant, warm weather, prolonged until nearly the middle of December; and all farming operations are well finished up. Since then the weather has been steadily cold, with a little snow, not enough for general sleighing.

We have not had the usual fall rains, and farmers are much troubled by the scarcity of water; many wells being dry.

WILLIAM W. STACEY,
Secretary.

STEUBEN.

I herewith transmit the report of the Steuben County Agricultural Society for the year now ending, a year which, in all its

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aspects, has not been a most favorable and profitable one to our farming classes. The promised return of seed-time and harvest was realized in a spring opening with warm and pleasant days, with now and then a warm shower of rain to loosen the soil and encourage the growth of the young plants and vines, and in an autumn whose bright and summer-like hours, free from long, vexatious rains and storms, gave the farmer ample time to gather into the granary the products of the soil and to prepare himself against the storms of winter.

A glance at the map of the State shows readily that our county is opened from north-west to south-east by two valleys running nearly parallel, in one of which the Conhocton river flows, and in the other the Canisteo river. The soil in these valleys is very fertile. The rest of the county, particularly that south of the Conhocton river, is made up in a great measure of uplands, hills and narrow valleys, through which, here and there, a narrow stream courses on its way to the larger Conhocton and Canisteo rivers.

These lands, embracing some 835,000 acres, have almost all yielded obedience to the axe and plow of the farmer; and the diversified situation of the country, its higher hills, its uplands, plains and valleys, afford us a far greater range in the character of our productions than in many other counties. Besides all the grasses, cereals, and succulent vegetables, we can grow the grape, the peach, and other more tender fruits, in certain large districts. But this past season the general yield of all crops was very much diminished by the continued dry weather of June and July.

The yield of winter wheat was about medium, say from sixteen to eighteen bushels per acre. Barley was very short in straw, and perhaps three-quarters of a crop in most localities of the county, with a yield of not to exceed twenty bushels per acre. Oats, a very light crop generally, very light in weight, short straw, and yielding about twenty-five bushels to the acre, on the average. Yellow corn was an average crop, running say from sixty-five to seventy-five bushels in the ear per acre. Of grass there was an average growth in the most of the towns, but the continued dry weather affected the pastures very much after the first of July.

Among our dairymen a new pest made its appearance this season, in the shape of a fly, in size and looks very much like the common house-fly, which would bite the legs and necks, principally, of the cows, causing the parts bitten to swell up and break out in running sores. In various dairies several animals were lost, and others rendered almost useless. Various remedies were applied, and with varied suc-

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cess. Some applied a mixture of sulphur and lard on the parts affected, and others different soothing solutions; but no remedy was used that proved generally successful. We have, thus far, escaped the ravages of the cattle diseases which have appeared in different parts of the country; and the appearance of this fly very naturally caused some little anxiety on the part of our dairymen and graziers, who comprise no small part of our farming classes. This county has long been known as a grazing county, and will soon rank among the first of the dairy counties of the State. Greater attention is yearly being given to butter and cheese making. Factories for making cheese are rapidly springing up in our midst, ten or more being already in successful operation in the county.

The census returns for our county will show that, besides being largely engaged in what might be called farming proper, viz., the growing of grain, raising cattle and horses, and the making of butter and cheese, our farmers are extensively engaged in the cultivation of the vine and the manufacture of wines and brandies. Grape culture, as a branch of industry, has grown up within a few years in this county. The favorite grape region or district, now so generally known as Pleasant Valley, is in this county, and a large share of the choice vineyards along the borders of Lake Keuka. The vineyard culture of grapes in this section of our county commenced about fifteen years ago. Land, formerly valued for ordinary farming purposes at fifteen or twenty dollars per acre, found ready purchasers at two and three hundred dollars per acre, when its value for grape growing became known. The area now planted with the vine is supposed to contain about 3,000 acres, or 2,400,000 vines. Bearing vineyards have been sold in past years at from ten to twelve hundred dollars per acre, and this amount of money has been realized from an acre at a single vintage; but such are exceptional instances of profit that occurred before the general decline in prices consequent upon the appreciation of our currency. The yield of grapes from a well-kept vineyard, in full bearing, varies somewhat with the variety planted; but a good, fair average is 2,500 pounds per acre. The number of acres in *bearing* in this county alone is presumed to be about 2,000. The varieties chiefly grown are, Catawba, Isabella, Delaware, Concord, Iona, and Diana. Several other varieties are somewhat grown, but these form the great bulk. The proportionate quantity of each variety may be represented thus: Catawba, $\frac{5}{9}$; Isabella, $\frac{2}{9}$; Delaware and Diana, together, $\frac{1}{9}$; and Concord and Iona, $\frac{1}{9}$. The aggregate annual yield is estimated at 6,500,000 pounds, or between three and four thousand tons.

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A large part of the grapes are packed, shipped and sold for table use, in New York, Philadelphia, Boston, and the southern cities, mostly, while the rest are used in the making of wine and brandy. The grapes most highly esteemed for their fine wine-making qualities are the Catawba, Iona, and Delaware; and the soil, surroundings and culture have enabled the vineyardists of this locality to grow in perfection those varieties, and to such a degree that they are acknowledged as unsurpassed for high wine-making qualities by the grapes of any other section of the country.

Incident to, or as a natural outgrowth of, the grape culture, wine-making was undertaken seven years ago in Pleasant Valley, and since then the manufacturers have achieved unlooked-for success, both in the excellence of their productions and in the extent of the business done by them. There are now three companies, each having large vaults and commodious superstructures, and making largely of still and sparkling wines and brandies.

The company first organized, and doing the largest and most flourishing business, is the Pleasant Valley Wine Company, located about two miles up the valley from the village of Hammondsport. Commencing with a small capital, it has grown in business and popularity. The company used in their manufacture of wine, in 1860, 35,900 lbs. of grapes; 1861, 39,000; 1862, 271,800; 1863, 194,000; and in 1864 about 500,000. In 1865 this company commenced the manufacture of sparkling wine, or champagne, making that year 20,000 bottles of sparkling wine, 15,000 gallons of still wine, and 1,000 gallons of brandy. Year by year since that time their business has rapidly increased, so that, in 1869, they manufactured 130,000 bottles of sparkling, 28,000 gallons of still wine, and 1,100 gallons of brandy. In 1870 they have put up about 170,000 bottles of sparkling, with a corresponding increase in their other manufactures.

The society year, now rapidly drawing to its close, commenced with the annual election of officers, at the annual meeting held in this village the second Wednesday of January last. The attendance was good, and the deep interest which the members present seemed to take in the affairs of the society was marked.

At this meeting Charles H. Robie, of Savona, was elected President, R. E. Robie, Secretary, and Geo. W. Hallock, Treasurer.

Aside from the many meetings of the officers, the general distribution of books and pamphlets and seeds, kindly furnished us by the State and the State Society, and by the commissioner of agriculture at Washington, the working of the society for the year is to be

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summed up in its eighteenth annual fair, which was held on the society's grounds at Bath, on the 5th, 6th and 7th of October last, which proved to be a gratifying success, the number and variety of entries in some departments being larger than ever before, while the gate receipts were more than of any previous fair. The first day, Wednesday, was dark, cloudy and gloomy throughout, interspersed with sprinkles of rain, and so thoroughly threatening that the officers of the society almost feared the exhibition would prove a failure. This day was mostly devoted to the making of entries and the general arrangement of animals and articles, and the attendance of visitors, as usual the first day, was very light, though the number of entries quite equaled those of the first day of any previous fair. Thursday, the second day, the weather was somewhat better, though still cloudy and anything but promising in the morning. However, despite the warrings of the elements, the members and friends of the society poured in upon the grounds from every direction, and it was estimated that, at twelve o'clock at noon of that day, there were more people upon the grounds than had ever been there before. On Friday, the crowd was large, and the weather throughout charming. The receipts for the three days were larger than ever before, and this result is in a great measure owing to the strict rules adopted as to admissions. The old system of family tickets, badges, etc., so conducive to *large family* attendance at fairs, was abolished by us in 1867, and in its stead we inaugurated a system of checks, which works admirably. Each person, on payment of one dollar, becomes a member of the society, and is entitled to enter any animal or article, or number of the same, in competition for the regular premiums of the society, except horses, for which he must pay an additional dollar for each entry. He is also entitled to seven single checks of admission, good for one entrance only. All attendants upon cattle, horses, machinery, etc., are furnished with free passes. The aim of the system is to require every person passing the gates to present a check, which is taken from him. It works well when once understood, and we would strongly recommend its adoption by those societies still adhering to the old system of family tickets.

Of cattle the exhibition was good, and the animals presented of a superior class of blooded Short-horns. Messrs. McElwee & Robic, of Savona, showed a fine bull calf, "Duke of Bath," and two cows, "Hope 10th" and "Garland," lately purchased by them from the well known herd of Chas. K. Ward of Le Roy, N. Y. Of grade Short-horns there were several fine animals, principally from the

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herds of Samuel Crumb and John Richardson, Bath, and McElwee & Robie, of Savona. Of grade Devons, natives, fatted cattle, working oxen, steers and milch cows there was also a good show by G. H. Brundage, Robert B. Wilkes, Geo. S. Haverling and John A. Bowlby, of Bath. Of the long and middle-wooled classes of sheep, the show was larger than ever before, and very fine. The principal exhibitors were Mapes & Jordan, of Tyrone, Schuyler county, and A. C. & M. Brundage of Bath. In the swine and poultry departments the number of the entries was large and the animals superior. The show of stallions, matched and single horses, and mares and colts, was never better, the animals presented showing with marked distinctness those points so necessary to the good roadster, farm horse, carriage horse or breeding mare. The efforts of our breeders in improving the class of horses found in our county, are at each return of our fair becoming more and more apparent.

Of all kinds of farming and mechanical implements, mowers, reapers, tedders, hay rakes, drills, plows, cultivators, straw-cutters, there was a large and excellent display, principally made by the firms of Hardenbrook & Co., Campbell & Brown, Howell & Barron, and K. Church & Co., of Bath. The display in agricultural hall made by the ladies was highly creditable to them and to the county. The numberless entries of canned fruits, jams and jellies, domestic manufactures, butter, cheese, flowers and fancy articles, made by them, prove conclusively that they are alive, and zealous in their efforts to sustain the society.

The grain, vegetable and fruit department was full and the show very attractive. One very notable feature in this department, was the exhibition by General O. F. Marshall of Wheeler, of potatoes and seedlings, correctly named, representing over 110 distinct varieties, and all grown by the General himself. This entry attracted much attention. In the department of wines and grapes, the Pleasant Valley Wine Company carried off the first premium for the largest and best collection of grapes grown by them, consisting of some twenty-one varieties. Their exhibition of their Claret, Sweet Isabella, Sweet Catawba, Paris Exposition, Carte Blanche and brandy, all made at the company's vaults, elicited the highest praise from all.

The lively competition between the agents of the various sewing machine companies, for the premium offered for the best family sewing machine, was noticable. From among a large number of competitors, the committee finally awarded the first premium to the Singer machine, exhibited by J. W. Curtiss of Bath. There were many

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other noticeable features in the show; but it is probably unnecessary more fully to enter into details.

The exhibition we consider to have been a success, and will, we believe, result in greater or less good to the cause of agriculture in this county.

Appended hereto is a statement of the receipts and expenditures of the society for the year:

RECEIPTS.

Cash on hand at date of last report	$182 85
Pulteney land office (donation)	50 00
Membership tickets sold at fair	628 00
Gate fees at fair	1,124 55
Licenses at fair	11 25
Rent of driving park	20 50
Horse entrances at fair	91 50
Pumps on the grounds	2 00
Annual fair dance	211 50
State appropriation	353 44
	$2,675 59

EXPENDITURES.

Interest paid on mortgage debt	$184 73
Paid note of society to H. Myrtle and interest	266 03
Paid for lumber for stalls on grounds	111 25
Paid printing for the year	161 00
Secretary's salary for 1869	100 00
Paid on principal of mortgage debt	400 00
Band for fair	140 00
Insurance on buildings	30 00
Postages for the year	17 54
Paid in premiums awarded	709 75
Paid other current expenses of the year	354 61
Balance in treasury this date (December 31, 1870)	200 68
	$2,675 59

R. E. ROBIE,
Secretary.

SUFFOLK.

PROCEEDINGS OF THE BOARD OF MANAGERS.

The board of managers of the Suffolk County Agricultural Society, met at Riverhead, April 20, 1870, President B. D. Carpenter in the

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chair. Preparations were made for holding a horticultural exhibition on the 22d and 23d of June, 1870. A premium list was prepared calling for fruits, flowers and vegetables. Judges for the several classes were appointed. William Nicoll, Hewlett Scudder and R. T. Goldsmith were appointed a committee to arrange for a social gathering on the evening of the first day of the exhibition.

The horticultural exhibition on the 22d and 23d of June, 1870, was a decided success. There was a very fine collection of fruits, flowers and vegetables. The social gathering in the evening with music and dancing, though somewhat a new feature in the history of agricultural societies, was, it is believed, productive of much good in the light of a country re-union. The building was tastily trimmed and decorated with flags and evergreens, and well-lighted. Excellent music was furnished from the city. The very best order prevailed. The fairest and the best of Suffolk county's sons and daughters, participated in the festivities.

The annual fall exhibition was held at the fair grounds at Riverhead, on the 5th, 6th and 7th of October. Although the weather was dark and chilly during two days of the exhibition, the attendance was good and the exhibition quite up to the average. The amount expended in premiums was much larger than heretofore.

At the annual meeting, held at the court-house at Riverhead, on the evening of Thursday, October 6, 1870, B. D. Carpenter called the meeting to order. In the absence of Thomas S. Mount, the secretary, William Nicoll was chosen secretary *pro tempore*. The minutes of the last meeting were read and approved. The following named gentlemen were then elected for the ensuing year:

President, B. D. Carpenter, Cutchogue; Secretary, Thomas S. Mount, Stony Brook; Treasurer, Joshua L. Wells, Riverhead.

Mr. Robert W. Pearsall, of Brentwood, was introduced, and delivered the annual address. At its conclusion, Henry E. Huntting moved a vote of thanks to Mr. Pearsall for his beautiful address, and that a copy be requested for publication in the proceedings of the society.

Mr. Pearsall moved that a ladies' horticultural association be organized for the county of Suffolk, as auxiliary to the Suffolk County Agricultural Society. The motion was carried.

On motion of Henry E. Huntting, the whole subject was referred to a committee of four ladies: Mrs. H. G. Scudder, Mrs. R. W. Pearsall, Mrs. R. T. Goldsmith and Mrs. B. D. Carpenter. The meeting then adjourned.

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The board of managers met at Riverhead, December 12, 1870. The premium list for 1871 was prepared. Judges were appointed for the several classes. A new class was established for needle and artistic work, thereby lessening the labor in the department of domestic manufactures.

It was resolved to hold the second annual horticultural exhibition on Wednesday the 14th of June, 1871. The premium list for this exhibition was prepared.

Discretionary premiums were then awarded, and a large number of diplomas and public documents arranged for distribution.

The eighteenth annual county fair was appointed for the 4th, 5th and 6th of October, 1871. The following terms of admission to the fair were adopted:

Every exhibitor shall purchase for one dollar, a ticket which will admit the exhibitor only at any time during the fair, and shall not be transferable. Single admission, twenty-five cents, or five tickets for one dollar Life members to be entitled to all the rights and privileges of exhibitors. This plan was adopted after an interesting and protracted discussion, as the most available means proposed to enable the society to collect its just dues.

TREASURER'S REPORT.

Receipts.

Cash on hand	$945 68
Net proceeds spring exhibition	610 45
Gross receipts October fair	2,038 20
	$3,594 33

Disbursements.

Premiums	$1,015 00
Interest on debt	495 13
Expenses of horse exhibition	140 00
Repairs and improvements	582 42
Expenses of annual exhibition	508 47
Miscellaneous	133 14
Printing	242 00
Cash on hand	478 17
	$3,594 33

THOMAS S. MOUNT,
Secretary.

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TOMPKINS.

The Tompkins County Agricultural and Horticultural Society held its annual meeting at Ithaca January 4th, and elected the following officers: President, F. C. Cornell, Ithaca; Secretary, H. D. Cunningham, Ithaca; Treasurer, O. B. Curran, Ithaca.

We had but a very small attendance at our meeting, and those present were grieved with the apparent lack of interest manifested by the people of this county in their agricultural society, and we elected almost an entirely new set of officers, hoping they might manage the affairs of our society in some manner to awaken an interest in its behalf.

The annual fair was held on the society's grounds at Ithaca, on September 14th, 15th and 16th, 1870. The weather, part of the time, was unfavorable, and the attendance quite small the first two days.

The exhibition in most departments was very good. The show of horses was very fine, and elicited very general approbation. The show of cattle was good; not so large as on some former occasions, but equally as fine. The exhibition of sheep was probably the best ever in the county, but mostly confined to the long and middle wools. The general falling off in the price of fine wool has had the effect to drive most of the fine wool sheep from our midst, while the farmers have mostly confined themselves to the breeding of mutton sheep. The show of swine was very small, although the county is not behind in breeding fine hogs, as our markets will show.

The exhibition of farm machinery was particularly fine, much of it being manufactured in the county. The exhibition of the mechanical department was not large, but some good articles exhibited.

The show of fruits and flowers was very fine, and elicited very general praise from all present.

The total receipts were $862.09; expenses were, for premiums, $394.50; other expenses, $132.26.

The society's greatest drawback is the apparent lack of interest manifested by the most of the farmers of the county, and by others, toward the welfare of the society, and it is the earnest wish of the officers that the society may be more flourishing in the future than it has been in the past.

It is hard to determine the yield of the crops for the past year, but I would say that, owing to the great drought, some of the crops were light, especially oats and barley. The wheat and corn crops were

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probably as large as an average of former years, and of good quality.

E. BREWER,
Secretary.

ULSTER.

The annual cattle show and fair was held on the society's grounds at Kingston, on the 21st, 22d, and 23d days of September, 1870.

An address was delivered before the society at the floral hall on the last day of the fair, by X. A. Willard, Esq., which was listened to by a considerable audience, and was a learned, instructive, and eloquent exposition of the sphere of the farmer.

The following is a list of the officers elected for the ensuing year: President, L. N. Heermance, of Kingston; Secretary, William Lounsbery, of Kingston; Treasurer, Charles P. Ridenour, of Kingston.

Summary statement of the receipts and expenditures:

On hand at the close of last year	$77 79
Receipts of the fair	1,362 65
Received from State	333 94
	$1,774 38

Interest	$56 00
Insurance	75 00
Bills audited	420 47
Premiums	1,028 53
Balance on hand	194 38
	$1,774 38

WILLIAM LOUNSBERY,
Secretary.

WASHINGTON.

The annual meeting of the society was held at Argyle, January 18th, 1870, and an award of premiums made on such crops as were not matured at the time of holding the annual exhibition.

Officers elected for the year were: President, Berry Long, of Cambridge; Treasurer, Wm. M. Holmes, of Greenwich; Recording Secretary, R. W. Pratt, of Fort Edward; Corresponding Secretary, Milo Ingalsbe, of South Hartford.

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The board of managers held its first meeting on the third Tuesday in March, to appoint superintendents of departments, and viewing committees, and designate the time for holding the fair.

The premium list was also thoroughly revised and enlarged, and cash premiums offered to the amount of $2,130; to which was added 115 volumes of agricultural publications, and seventy-seven diplomas. The whole distributed among fifteen departments, to wit: Field crops, $151; cattle, $433; horses, $254; sheep, $133; swine, $33; poultry, $78; butter and cheese, $18; domestic manufacture, $36; farm implements, $64; mechanical department, $112; fruit, $72; vegetables, $52; trial of speed of horses, $175; trial of fire engines, $150; ladies' department, $375.

A second meeting of the board was held on the third Tuesday in August, to complete the programme and arrangements for the autumn exhibition.

The fair was held on the society's grounds, at Salem, on the 5th, 6th, and 7th days of October. The first day was mainly devoted to making and recording entries. By regulation of the society, all articles for competition were in place by eleven o'clock, A. M., of the second day; the books closed and delivered to the respective viewing committees. The grounds were open to the public during the whole of the three days. Single admission tickets were twenty-five cents each, and good for one day.

An unprecedently large list of entries was made, and, considering the disadvantages (hereinafter particularized) under which the society labored this year, the exhibition was creditable to the people of the county.

The amount of cash premiums paid during the year is $1,800, with a corresponding number of diplomas and agricultural volumes. No one of our previous fairs had called out so large an attendance of people. The weather was favorable during the three days; and, notwithstanding the crowds upon the ground, order was maintained, with but little resort to the aid of an efficient police, under orders of a chief.

On the afternoon of the third day the customary annual address was delivered from the stand in the centre of the grounds by Gen. Marsena R. Patrick, of Onondaga county, for the time the guest of Hon. John McDonald; and, we think, rarely has so intelligent and appreciative an audience gathered around a speaker.

His well-earned fame secured for him in advance a merited welcome as he appeared upon the stand. His theme, prepared for the occasion,

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and specially for the young people who should hear him, delivered in his own peculiarly modest but impressive manner, won for him a hearty sympathy, and secured attention during the entire continuation of his address.

Long will the young people of Washington county have occasion to remember the sage and fatherly advice of the hero and patriot, as, under the cheeriest of autumnal skies, at the base of the Green mountains, on storied ground, overlooking the site of the initial settlement of the county, thickly strewn with heroic memories, he counseled them of their duties to the hour.

With what pathetic earnestness, after portraying the day-dreams of the stalwart fathers, he detailed his own experience in the department, the trying duties of which he so capably performed during the terrible years of our country's history.

His appeal to the young man to stick to the farm carried conviction to all of its timely propriety; and one looking over that assemblage could but be struck with the appearance of thoughtful groups here and there clustered, with almost breathless silence listening to catch the every word that fell from his lips. Fortunate is the man who is permitted to leave so large an impression for good along his life's pathway.

Every member of the board of managers was in attendance during the exhibition, and each endeavored to perform well the part assigned him; but that the whole programme, so excellently devised, was so completely successful to the conclusion, with so few errors to rectify or grievances to redress, should largely be credited, as heretofore, to Messrs. Long, Holmes, and Pratt, respectively, the able and untiring president, treasurer, and secretary of the society.

The board, with the exception of the treasurer and recording secretary, receive no pay for their services; the former is allowed $75, the latter $100, per annum.

From various causes, the past season was not a remarkably successful one for the agriculturist in this county. Principal among them may be here named drought, grasshoppers, and wind and hail storms.

Never before, we think, has this county experienced so long and severe a drought. Since March no rains have fallen in quantity to wet more than the surface of the earth (and these rains but seldom); fields have been parched; many streams dried; hundreds of wells and fountains, supposed to be perpetual, have been and are dried up; and in many localities, with much difficulty farm stock is brought to water.

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Attendant upon the drought, as usual, came swarms of grasshoppers, literally clouds of them. Whatever vegetation did appear was voraciously devoured by these pestiferous insects. Thousands upon thousands of acres were made as bare of vegetation as if recently turned by the plow; the entire products of gardens, without number, were destroyed; so of fields of beans and oats; while fields of corn, looking fair at a distance, upon examination showed that the omnipresent intruder, fastening upon the protruding silks of the ears as soon as formed, and feasting upon them, prevented the fecundation and growth of kernel. All growing crops suffered. Bushes by the roadside were stripped of their leaves, and even fences were attacked by them. As everything material in time comes to an end, so these noxious pests vanished with the incoming cool nights of September, no one knowing whither.

A particular feature of the season was the passage of several storms of wind and hail across the county, all taking nearly a due east course. Four of these were more noticeable than the others; two of them, somewhat limited in width, swept over the southern portion of the county during the latter part of June, one doing considerable damage in a section noticeable for its large acreage devoted to the culture of rye. At first it was thought that the straw, having attained its growth, though killed by the force of the storm, might, after drying, be manufactured into paper, and not be an entire loss. Upon trial, the fact appeared that the berry, just forming, exhibited so much starch, the manufacturer could not work it.

These storms were usually accompanied with high wind, and the one most disastrous swept across the width of the central portion of the county on the 6th of August, a condensed description of which is borrowed from a detailed report of observations made for the Smithsonian Institution, premising that the writer of it, at the commencement of observation, was several miles to the eastward of the station, traveling westward toward it, and arriving there simultaneously with the bursting of the storm upon that point, and being nearly in the line of the central track of the final tornado.

The day had been cloudless, the thermometer ranging high, with a suffocating atmosphere, when, at about 12 o'clock, M., the sky still being clear, a large cumulus cloud pushed up from the far north-west, accompanied after a half hour with mutterings of thunder. At one P. M. the cloud had accelerated its motion toward us, increasing in size, covering quite one-third of the northern horizon. It came within seven or eight miles of us, when rain commenced falling from its

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more advanced portion, the cloud changing its course, passing away slowly somewhat north-eastwardly.

It was subsequently learned, from a party of health-seekers among the Adirondacks, that at the time mentioned in the beginning of this statement, they being on one of the Saranac lakes, the cloud here described suddenly formed over their heads, and, though then diminutive in size, it assumed a threatening aspect. They decided at once to row for camp. Hardly had they pulled a dozen strokes before down came a deluge of rain, wind and hail, rendering their frail craft unmanageable, and with difficulty did they reach a place of safety.

Soon after the change of course above noticed, a portion of the south-eastern limb of the cloud separated from the main body, moving a little to the south, seemed to rest upon one of the mountains in the west of Fort Ann (adjacent to Warren county), enveloping its crest a half mile in extent, and some seventeen or eighteen miles from the station, with no appearance of rain, but dark and black as night underneath, indicating a course about west-north-west. This detached cloud increased slowly in size, rolling down along the sides of the mountain. After the lapse of twenty-five to thirty minutes, the main body of the original cloud or shower being due north of the station and eight or ten miles distant, the Fort Ann cloud began to exhibit unusual commotion, moving gradually to the south-east. Sometimes this whole cloud seemed to be rotating; then currents or drifts would be seen passing through it upward, downward, sideward and circularly in rapid succession; then, again, detached portions would rush at each other and become annihilated. At two P. M. the cirrus clouds with which, except on its northern border, the rising tornado was surrounded, began to stratify, a few drops of rain falling at or near the head of Lake George, the northernmost limit to the cloud proper about twelve or thirteen miles distant, and in sight.

Now commenced the play of the spirit of the storm. Those stratifying clouds, as they severally and slowly were drawn toward the central point, before impinging upon the storm-cloud, would shoot off into distance, with a swan-like grace indescribable, to return and repeat unnumbered their coquettish measures. Meanwhile the aerial volcano, gathering force and velocity, opened in its foremost portion in a clear circular area of two and one-half degrees diameter, altitude fifty-five degrees, through which, contrasted with the blackness underneath, the snowy foam, piled to immensity and bathed in sunlight, with the point of azure piled for a background, contributed a picture and combination of the fearful, beautiful and sublime rarely seen by

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man. Continuing thus for several minutes, accompanied by numerous discharges of heavy thunder, the storm-spirit seemed to gather all its force, swooped over the town of Kingsbury like a thing of terror, plunged onward with a deluge and tornado of rain, hail, wind and lightning as it entered the town of Hartford, by a path somewhat less than a mile in width, at and north of the Baptist church in Adamsville, on a general course three degress south of east, passing the central highway of the town at the farms of Thomas Gilchrist, S. D. Kidder and Levi Ely; leaving the town on the east beyond the residences of J. Chapman, L. Hall and A. Gowdey; then dancing on in its demoniac revelry over the town of Hebron, into Vermont. At West Rupert but few buildings were damaged, otherwise than the pounding to pieces of their roofs and destruction of windows by hail. The storm occupied about fifteen minutes in passing a given point with hail, followed by eighteen minutes of rain. The thermometer falling from 92° F. to 53°, and rising again at 4.30, P. M., to 90°. While the general course of the storm was nearly east, its movements were vibratory laterally; and in some instances it seemed to bound or skip over quite a number of fields, leaving some crops much less injured than those of adjoining fields lying in the same plane. On the northern skirt of the storm wind did not prevail till the fall of hail ceased. In all of its other portions it was attended with a fierce, whirling gale of wind; the hailstones striking first upon the western side of buildings, then upon the northern, and, finally, on the eastern or north-eastern side, with nearly uniform force. The depth of hail was, as measured, two and a half inches; of rain fall, eighty-hundredths of an inch.

Along the pathway of the storm, fall crops, as corn, buckwheat, beans; with apples, pears, grapes, and plums, of which there was promise of abundance, were nearly destroyed; and potatoes, damaged to what extent is yet unknown. Gardens totally destroyed. Now and then a belated oat or wheat crop was annihilated. Some farms were entirely denuded of fences, and young fruit trees very badly damaged. The momentum of the balls was such as to form quite large indentations on fences and walls of buildings; and, notwithstanding the extreme heat of the weather, large quantities of the missiles remained in sheltered places for several days. The hail-stones were smooth and spherical, of various sizes, from that of small bullets to one and one-fourth inches in diameter. Of the latter size, specimens were common, though all the larger ones were much flattened. Nearly every one was made up of a transparent shell, inclos-

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ing a solid white nucleus about the size of a buckshot. As the sun emerged from the clouds at 4.25 we witnessed the singularly unusual phenomenon of a bright inverted rainbow reflected from the transparent hail stones with which the surface of the earth was covered. The belt of country along, or over which this whirling, vibratory and bounding tornado passed, never before experienced a like calamity.

In bringing this report to a close it may be proper, in this brief resume of agricultural progress, to approximate results. The hay and grass crop was less than half the usual one, though of the best quality. A large bulk of the old stock was on hand, so that, in connexion with a large reduction of our herds of cattle and sheep in early autumn, and mild weather continuing, pasturage was available till December 1st, or even later; and early winter being thus far uncommonly mild, no serious apprehensions are entertained of lack of forage for the remainder of winter.

A larger breadth was devoted to corn this year than usual, and the first half of the season gave promise of an extraordinary growth. But even this hardy cereal succumbed to the drought, and other casualties. The ears were short. The amount of grain grown was, after all, more than an average crop.

Oats were less than one-third of a good crop, whether of straw or grain, and of poor quality, especially so in localities where harvesting in the green state became necessary to preserve from the ravages of grasshoppers. Of new varieties, the excelsior, early Somersetshire, white Schonen, and white Probesteier promise well.

Wheat, both winter and spring varieties, was a light crop.

In general, the rye crop did not furnish half an average yield, either in straw or grain; though in the more southern towns of the county farmers were satisfied with the results of their harvests. This is an important and increasing staple of our county, since our half-score of paper-mills offer a large, convenient, and remunerative market for straw.

Barley and peas were very good. These grains are not as extensively grown as formerly. Increased interest is felt in the culture of beans, and this year's yield was satisfactory. Favorites for field culture, besides the pea-beans are the dwarf kidney, oyster and marrow-fat varieties.

Favorable mention may be made of the flax crop; but it becomes evident, from year to year, that its cultivation is decreasing. Our thirty, or more, flax-mills have dwindled to a half-dozen.

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Buckwheat was only a nominal crop in the northern towns. In other portions of the county, quite fair. Owing to the disastrous failures of the potato in 1869, very many less acres were planted with this crop in the spring of 1870, than in any one of several previous years. And although the bulk at harvest was comparatively small; the tubers being all sound, the soil dry, light, and easy of working, the autumn holding late, with uninterrupted pleasant weather, rendering the labor of digging and hauling to market less onerous and expensive than usual; and the unprecedented high market price of the article, combined to make it the most remunerative crop of the year. The peach-blow is yet a favorite variety. The Jackson-white holding its own when renewed with seed from Maine, its native place. Some 350,000 bushels were shipped, as against 800,000 in former years, with but a light stock in store.

Fruit of all kinds was produced in abundance. Premature ripening very materially injured the keeping quality of apples. Large quantities of cider have been manufactured.

The business of dairying was much increased the past year in the cheese department. Drought must have reduced the product nearly to the figures of former years, with a corresponding reduction of profit of at least thirty-three per cent. Generally this branch of agriculture has been remunerative, yet in very many cases it has proved disastrous; cows bought in the spring at fabulous prices, in a few months were sold for less than one-third of the purchase money.

Our dairy herds are so much reduced as to anticipate a marked deficiency the coming year. The rearing and management of horses, poultry and swine, have been eminently successful the past year. The same cause that operated to the detriment of sheep husbandry last year, still continues. This branch of agriculture has doubtless reached its lowest ebb. A fair enumeration would show a diminution of more than one half in number compared with five years since. Many of our best flocks have become extinct.

The depredations of the currant and cabbage worms have been extensive throughout the county. On the whole the Washington county farmer has no occasion to bate one jot of heart or hope. The prosperous manufactures of lumber, iron, machinery, lime, wool, farm implements, paper, slate and various wood materials, create a market for nearly all his products at his door, while his facilities for transportation by lake, canal and railroad, enable him with comparative ease to compete in the great marts of trade.

The working season has been prolonged from four to six weeks

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later than the average of previous years, of which the farmer has taken advantage, and by ditching, underdraining, hauling stones, plowing, fencing and other general repairing during these weeks of comparative leisure, has secured a position from which to prosecute the coming year's business with uncommon efficiency.

The annual meeting of the society was held at Cambridge January 17th, and officers were elected for 1871, as follows:

President, Berry Long, Cambridge; Recording Secretary, R. W. Pratt, Fort Edward; Treasurer, William M. Holmes, Greenwich; Corresponding Secretary, Milo Ingalsbe, South Hartford.

The report of the board of managers was presented by the corresponding secretary and adopted by the society, and the following resolution was adopted:

Resolved, That each future president of the society at the expiration of his term of office, shall be retained in the service of the society for the period of five years thereafter, as an advisory member of the board of managers, with power to vote at any business meeting of said board.

RECEIPTS.

Balance on hand	$1,714 68
Gate receipts, three days	2,267 47
Hotel subscription	70 00
Rentals	213 00
Life member fund	90 00
State appropriation	299 81
Interest	95 00
	$4,749 96

DISBURSEMENTS.

Police	$302 50
Lumber and teaming	70 75
Music at the fair	127 00
M. R. Patrick, address	25 00
Insurance	9 00
Other fair expenses	571 57
Printing	139 50
Stationery, postage and secretary's expenses	189 00
Premiums	1,774 75
Balance carried to new account	1,540 89
	$4,749 96

MILO INGALSBE,
Secretary.

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WARREN.

The Warren County Agricultural Society has assumed a permanent form. The location of its fair grounds at Glen's Falls having established, beyond a question, that the great mass of people choose to attend fairs where they can procure suitable "accommodation for man and beast," as well as be treated to fine exhibitions.

The annual fair was held on the 13th, 14th, 15th, and 16th days of September, 1870.

Additional buildings having been erected and improvements made in the old buildings, every exhibitor was furnished a suitable and convenient place for his use.

Owing to the long continued dry weather which prevailed throughout our county, the managers of the society were apprehensive that but a poor display of the fruits of the earth could be presented, and many were the expressions in that direction; but, thanks to a kind Providence, the yield was more abundant than had been hoped for, and a magnificent show of farm and garden produce was had. In fruit, particularly, there was such variety and such perfection as encouraged all, and gave assurance that our county could supply its inhabitants with the choicest, and have abundance to export.

Our farmers are determined they will not be outdone. They accept the theory that the soil is susceptible of a higher and better cultivation than it has hitherto received, and they are devoting their money and their labor to its accomplishment, each year's production encouraging them in the prosecution of this laudable undertaking.

While tilling the soil with such patient care, they are not unmindful of the advantages which accrue from greater attention to breeding good stock. Every season witnesses a growing pride in this department, and many fine specimens of choice breeding were presented for competition. In horses, for speed, roadsters, and all work, many noble animals were shown which were, at once, the pride of their owners and of every resident of the county; for where could better be produced?

Of cattle, new varieties are making their advent among us, and, as a result, choice dairies abound, making ours a butter market of which we need not be ashamed, and furnishing most excellent beef for our markets.

In variety and quality of sheep, we do not consent to rank second to any. We have had a place among the notable sheep growers, and

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shall continue to hold it; for, having obtained so good a foothold, it will not be easy to outrank us.

The swine breeders adopt the "whole hog or nothing" doctrine, and each season produce such animals as call out the expression from visitors at the pens: "That's my style of pork."

The choicest variety of poultry always to be seen at our fairs makes this emphatically a head-quarters for many varieties. The large variety displayed at this fair was an occasion of remark by all.

The manufacturers have caught the spirit of the farmers, and brain is at work with muscle, annually producing results which excite the admiration of those who are at all observing. The present year was not an exception to the general rule, but beautiful, easy-riding, and easy-running carriages, in large variety of patterns; strong, heavy, well-constructed draught wagons and carts; agricultural implements, horse-shoes of improved patterns, and a hundred devices to make easier and pleasanter the task of both horse and owner were produced, and truly we begin to realize the resources within our reach.

The contrast between the convenient farm implements now in use and those with which our ancestors labored, wakes us up to the fact that we are progressing and rapidly becoming a mighty people. It might seem that, with the rapid improvement in manufactures, our people would be content; but no, their Yankee brains, being in motion, will not stop until still greater achievements are manifested, and the world is made better for their having lived in it.

It were a tiresome task to enumerate the articles displayed; suffice it to say, that in beauty of form, in ease and elegance of action, and in eccentricity of mechanism, the exhibition has not been excelled by any of the previous fairs of this society, if, indeed, by any of the exhibitions of the societies of our neighboring counties.

In the "home industrial department," we had greater facilities for accommodating exhibitors than ever before, and the endless variety of articles presented for competition, tastefully arranged by skillful hands, made that department the chief attraction during the entire exhibition, and though there is little in needle-work or painting, or any of the classes usually to be found in this department, which is literally agricultural, we are free to confess that without it our fairs would not prove so attractive.

The members of the society are full of hope that each succeeding year will be prolific with improvements until we may rank first among the societies of the Empire State.

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RECEIPTS.

Balance on hand	$1,179 75
Entries of horses	256 25
Rent of stands	55 50
Donations from sundry individuals	108 00
Members' tickets	1,414 00
Admission tickets	1,193 23
State appropriation	97 50
Interest	29 14
	$4,333 37

DISBURSEMENTS.

Printing	$228 25
Building and improvements	1,185 15
Postage and stationery	27 32
Expenses of fair	233 04
Salaries	417 50
Premiums	825 25
Races	350 00
Balance on hand	1,066 86
	$4,333 37

The following are the officers elected for the current year: President, Henry Griffing, Warrensburgh; Secretary, A. Newton Locke, Glen's Falls; Treasurer, Charles W. Osborn, Warrensburgh.

A. NEWTON LOCKE,
Secretary.

WAYNE.

I herewith send you a statement of the receipts and expenditures of the Wayne County Agricultural Society, for the year ending Jan. 5, 1871, and since my last report.

RECEIPTS.

Balance on hand	$40 36
State appropriation	307 00
Avails of tickets at annual fair, entrance fees and rent of grounds	374 83
From State	307 12
	$1,029 31

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PAYMENTS.

Rent	$148 81
Rent	117 78
Interest on notes and mortgages	256 12
Paid on mortgage	150 00
Premiums	132 00
Printing	33 00
Clerk hire	24 00
Police	9 50
Cultivating grounds of society	49 28
Grading track	34 40
Fences	20 00
Lumber, hardware, preparing floral hall, and all other expenses not included above	26 61
Balance on hand	27 81
	$1,029 31

The annual meeting was held January 18, and the following named were elected as officers for the ensuing year: President, William R. Rooke, Galen; Treasurer, Samuel J. Cole, Lyons; Secretary, John L. Cole Lyons.

The annual fair was held at Lyons, 17th and 18th days of September. The exhibition was creditable. There was a good show of horses and cattle, while the display in floral hall of fruit and vegetables has not been surpassed by that of former exhibitions.

Racing and trotting have, in former years, been conspicuous features of our agricultural fairs; in fact deemed indispensable to their success. The society is at present, however, less devoted to the above practices than formerly. As might be anticipated, many do not attend the exhibitions at present who were attracted to them by the excitement of the race. Notwithstanding this, we are encouraged in observing an interest increasing in the more legitimate objects of agricultural exhibitions, while our expenses are so much decreased, that we are enabled not merely to meet all our recurring obligations, but within two years have reduced old debts of the society, by payments on them of more than $400.

The wheat crop of this county above the average, both as to quantity and quality. Barley and oats a great failure; average about fifteen bushels to the acre; price of barley from seventy cents to one dollar. Hay not half a crop; price eighteen dollars per ton. Clover seed not half a crop. Potatoes yielded well, but warm rains, late in the season, rotted them badly. Onions did well; price $1 to $1.12 per bushel. Tobacco badly injured by the worm; price sixteen and

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twenty cents per pound. Fruit of all kinds abundant, and cheap. Apples $1.50 per barrel as average price. Mint an average crop; $2.50 to $3 per pound. The hog crop large, selling at $7 to $8.50 per hundred.

The failure of our spring crops was due to the drought, which prevailed with us this season to an extent not before remembered.

SAMUEL J. COLE,
Treasurer.

WESTCHESTER.

The twenty-sixth annual fair of this society was held on the society's grounds, in the town of Greenburgh, near White Plains, on the 12th, 13th, 14th, 15th, 16th and 17th days of September, 1870.

At the commencement of the exhibition everything indicated success, excepting that in consequence of the extended drought, which at the time was prevailing, clouds of dust that were almost unendurable threatened to keep some away who would otherwise attend.

The pleasant weather, the extra accommodations afforded by the late improvements on the grounds, and the largely increased list of premiums offered were a sufficient guarantee, however, that both the public and the society at large would be highly gratified with the result.

The board of managers during the year had erected a floral hall, fifty-six by one hundred feet, two stories high, a gate house to be used as offices for the treasurer and secretary, and other improvements costing nearly $10,000 which place the grounds in a condition second to none, and equaled by few in the State.

The same programme was adopted as the previous year, viz.: Monday and Tuesday were set apart for receiving entries; Wednesday and Thursday and Friday forenoon to the exhibition of agricultural and horticultural products exclusively, and Friday afternoon and Saturday to the trials of speed; this arrangement having proved satisfactory heretofore.

The entries in the aggregate showed an increase over the year 1869 of fifty-four, which increase was nearly equally divided among the different classes.

The entries in horses, however, also the entries in cattle, showed a slight decrease from the preceding year, which fact was attributed to the very dusty condition of the roads, which made the task of reaching the fair with animals of any kind almost hazardous. The exhi-

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bition of poultry, sheep, swine and field crops was truly encouraging, while the exhibition of garden vegetables, horticultural products, mechanics' work and domestic manufactures, far exceeded anything ever before held by this society.

The annual address was delivered on Thursday, at 2 P. M., by the Hon. Clarkson N. Potter. The award of premiums was announced by the secretary on Friday, at 12 M., when the fair, with the exception of the trials of speed, closed, and at the close of the day everything seemed to indicate that the fair, as far as the proceeds were concerned, would far exceed the most sanguine expectations of the board of managers. But on the morning of Saturday, a rain storm had set in which lasted all day; and, it is estimated, made a difference in the receipts of at least $1,500. Still the fair proved a success, and the receipts reached the sum of $6,085.67.

Receipts.

Annual fair and reception	$6,085 67
Life memberships	2,050 00
Donation, J. B. Haskins	25 00
Chas. W. Bathgate for premiums	70 00
Loan on bond and mortgage	6,843 34
	$15,074 01

Expenditures.

Buildings and improvements	$9,895 44
Printing and advertising	829 90
Insurance	67 25
Labor	1,731 10
Premiums	1,436 00
Supplies and petty expenses	793 30
Balance of old accounts	321 02
	$15,074 01

J. O. MILLER,
Secretary.

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WYOMING.

The amounts of the various crops in Wyoming county the past year, are barley, thirty-one bushels per acre; wheat, twenty; corn, forty-five; potatoes, 150; and apples, a very large crop, more than an average.

The treasurer's report shows the total receipts from all sources to have been $1,447.55.

EXPENDITURES.

Premiums	$559 50
Other expenses	697 85
Cash on hand	190 20
	$1,447 55

The following were elected officers for the ensuing year: Gideon H. Jenkins, Pearl Creek, President; L. Lockwood Thayer, Warsaw, Secretary; Harwood A. Dudley, Warsaw, Treasurer.

L. LOCKWOOD THAYER,
Secretary.

YATES.

The annual fair was held on the society's grounds in the village of Penn Yan, on the 5th, 6th and 7th days of October last, and was well attended. The interest of the people of the county, in keeping up the annual exhibitions of stock, farm produce and implements, seems to be on the increase. The number of entries at the fair, of articles and animals, was about 1,100. The receipts from all sources was $1,411.25. The amount awarded for premiums was $711.15. The amount paid for expenses was $401.89.

The annual meeting of the Yates County Agricultural Society, was held on the 14th day of January, 1871, and the following officers were elected for the year:

President, Dudley W. Dox, Penn Yan; Secretary, John W. Stewart, Penn Yan; Treasurer, Oliver G. Shearman, Penn Yan.

JOHN W. STEWART,
Secretary.

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REPORTS

OF TOWN AND UNION AGRICULTURAL SOCIETIES AND FARMERS' CLUBS.

Annual Report of the American Institute of the City of New York, Year Ending February 2, 1871.

In reviewing the financial, industrial and scientific operations of the American Institute during the past year, the trustees find abundant cause for congratulating their fellow-members on its continued success and increasing usefulness. Its several subordinate organizations having cognizance of the advancement of science and its application to the arts, as well as of the various improved methods of managing the factory and the farm, have by their regular meetings and discussions, evinced commendable zeal and activity. A detailed account of their proceedings will be found in the reports of the several standing committees having charge of these organizations. Unprecedented success has crowned the labors of the present board of managers. The large amount of money received, is the best evidence that the exhibition of 1870 was more attractive than any preceding display.

By the annual statement from the committee on finance, it will be seen that the permanent fund of the Institute has been materially augmented during the year, by the investment of $32,000 in United States bonds, making the total amount invested in this class of securities $70,000.

The real estate belonging to the Institute on Broadway and Leonard street, will probably be occupied for another year by the present tenants. They have made material repairs to the buildings, which as a whole, are now in better condition than at any former period. It has been deemed best to let this property to one tenant, and for short terms, in order to be able to give early possession of the premises in case a sale should be effected.

The location of this property in the midst of wholesale warehouses, and the convenience of its frontage on two streets, so enhance its

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value, that no difficulty will be found in disposing of it whenever the Institute decides to invest the proceeds of such sale in erecting a structure better adapted to its occupancy. To find a central location of ample area and very accessible from all points, on which the Institute might establish its permanent head-quarters, has been the constant aim of its trustees throughout the year, and although they cannot impart any positive information, it is proper to state, they are not without hope that advantageous propositions will soon be submitted for the action of the Institute. In the meantime, other considerations lead the trustees to suggest that early measures should be adopted for the better accommodation of its several departments, all of which have only a temporary occupation of premises from which they are liable to be excluded at the end of each year.

The amount now paid for premises used by the library, Farmers' Club, Polytechnic Association, Photographical Section, the course of scientific lectures and by the annual exhibition, exceeds $11,000. In addition to this, a large sum is annually expended for the temporary use of apparatus and fixtures. The gross receipts of the last exhibition were $72,000, while the expenses incurred amounted to nearly $51,000. A material portion of this sum would have been saved, had the exhibition been held on premises belonging to the Institute. Another potent reason for early action on the question of building, is that the Institute has formally announced that it will hold an international exhibition in the year 1876, to provide for which the permanent structure to be occupied by the Institute should be so located that it can be temporarily enlarged.

In obedience to the resolution passed at a recent meeting of the Institute, the board of trustees forwarded to the Congress of the United States a petition and pamphlet relating to the proposed international exhibition in the city of New York, to be managed by the American Institute, under the auspices of the general government. A counter movement, started in Philadelphia four years later than our own, has so far thwarted the Institute as to secure the passage of a bill through the House of Representatives which transfers the favor of the United States government, first asked for by the Institute, to the proposed exposition at Philadelphia. This action will not deter the American Institute from carrying into effect its original resolution, and, as it has never failed in any of its undertakings, all of which have been conducted without external aid, we may fairly infer it will succeed in 1876. Yet it would not undervalue the benefits which would accrue

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from the proposed international exposition receiving the official sanction of the general government.

The course of scientific lectures, given under direction of the board of trustees, at the Academy of Music, will close February 4th. It embraces well-known lecturers, who have not assisted in our previous courses.

The lectures have been well attended and favorably received, and more particularly by a large class of our members who do not avail themselves of other privileges accorded to them.

In conclusion, the trustees feel justified in expressing the opinion that no other association presents so many advantages and satisfies such a variety of tastes and intellectual wants as the American Institute, in its exhibitions, its weekly discussions, its lectures, its library, and its annual volume of Transactions. By this rare combination it has secured the elements of attraction and expansion which are essential to its strength and growth, and which insure its perpetuity.

Respectfully submitted.

HORACE GREELEY.
WM. HALL.
CHAS. P. DALY.
NATHAN C. ELY.
S. R. COMSTOCK.
GEO. PEYTON.
SAMUEL D. TILLMAN.

FINANCE.

Receipts and Disbursements of the American Institute of the city of New York for the year ending January 31, 1871.

Balance in bank, January 31, 1870		$772 99
RECEIPTS.		
Rental of property	$15,750 00	
Admission fees and dues and from life members,	6,262 00	
State appropriation, 1869	2,315 63	
Interest on investments	2,845 50	
From managers of the 38th annual fair	120 96	
From managers of the 39th annual fair	22,000 00	
Miscellaneous sources	104 50	
		49,378 59
Carried forward		$50,151 58

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Brought forward		$50,151 58

DISBURSEMENTS.

Taxes and assessments on property	$2,627 15	
Fire insurance and repairs	321 41	
Books, periodicals, and binding	855 69	
Rent of rooms in Cooper Union, and gas-light,	2,382 60	
Printing and stationery	140 46	
Freight and expenses Transactions from Albany	67 86	
Balance, course of scientific lectures, 1869–70,	504 86	
On acct. course of scientific lectures, 1870–71,	1,273 25	
Mineral case and alterations	327 08	
Reporting polytechnic and and photographical lectures	295 00	
Medals, medal cases, diplomas, etc., on account 38th annual fair	1,344 89	
Newspapers, advertising, postage, and incidental expenses, 38th annual fair	732 67	
Salaries	4,808 50	
	$15,681 42	
Invested in U. S. 5-20 bonds of 1867, 1868	32,062 50	
		47,743 92
Balance in bank, January 31, 1871		$2,407 66

THOMAS M. ADRIANCE,
THOMAS WILLIAMS, JR.,
SIMEON BALDWIN,
J. DELAMATER,
CHARLES CHAMBERLAIN,
Finance Committee.

AGRICULTURE.

The committee on agriculture, in accordance with the requirements of the by-laws, would respectfully report that their duties have been confined chiefly to the Farmers' Club, and that during the year the meetings have been held every Tuesday, excepting during the usual August recess, and seldom have the meetings failed to be crowded with an interested audience.

Our proceedings are published in most of the agricultural papers and in the newspapers of this city. They are published weekly, and thereby a vast amount of timely reading on the subjects which are discussed by the club are read by millions. The Tribune alone esti-

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mates that each week one million read the proceedings of the Farmers' Club of the American Institute in that paper. Nor can the committee fail to mention the World and the Times, who report at great length each week; also the Sun, Artisan, Independent and many other papers of this city and from distant places have their editor or reporter at every meeting. The proceedings are published in the Transactions of the American Institute, and this obviates a lengthy report. During the year thousands of parcels of flower seeds, cereals, and choice new varieties of potatoes, grafts, cuttings, grapevines, and strawberry and other plants have been distributed, and committees from the Club have visited Virginia, North and South Carolina, Georgia and Florida, Ohio, Kentucky, Utah, Colorado and California. From each of these States most valuable information was obtained. A number of committees have visited many portions of New Jersey and Pennsylvania with like results. Your committee might go into detail, as to the numerous agricultural implements which have been tested from time to time by committees appointed for this purpose during the year. Suffice it to say, much is done each year to lighten the labor of the tillers of the soil. These committees have not cost the treasury of the Institute a single dollar.

NATHAN C. ELY,
JOHN CRANE,
P. T. QUINN,
F. M. HEXAMER,
JOSIAH H. MACY,
Committee on Agriculture.

Report of the Library Committee.

The committee on the library beg leave to report that the library and reading room have been opened regularly during the past year, and have been the daily resort of many of the members, and also visited by many of our citizens and strangers for reference.

A number of choice works on science and art have been added and several important sets made complete.

During the year $855.69 have been expended in the purchase of books, periodicals and binding.

The supplement to the catalogue of books is in manuscript and it was hoped that the same would have been printed for the use of the members; but in consequence of the services of the librarian and assistant being required in preparing for the late exhibition, they have not had the time necessary for its proper preparation and superin-

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tendence through the press, but it will be immediately put into the hands of the printer and completed at as early a day as possible.

The committee take great pleasure in reporting that the books in the library are in good condition, and that at no distant day further provision must be made for its accommodation.

The whole number of volumes in the library at the date of the last report was		9,534
Added during the year by purchase	202	
donations and exchange	44	
		246
Making the total number of volumes in the library		9,780

JAMES K. CAMPBELL,
DUBOIS D. PARMELEE,
EDWARD WALKER,
SAMUEL D. TILLMAN,
Committee.

ANNUAL REPORT OF THE COMMITTEE ON THE ADMISSION OF MEMBERS.

The committee on the admission of members beg leave to submit their doings during the past year.

They have made eight reports to the Institute, recommending 136 candidates for admission as members, who have all been duly elected. There were 416 reported by the board of managers December 1st, 1870, and admitted January 5, 1871, making a total of 552.

By the above statement it will be seen that the committee have only acted on the names of 136 candidates, and the committee feel it their duty to call the attention of the Institute to this fact; and while it may be gratifying to receive such an addition to its membership, yet they believe that more scrutiny should be taken into the character of the applicants than the board of managers can give, in the hurry and excitement of the exhibition.

They would respectfully and earnestly urge that an alteration be made in the by-laws of the Institute, so that the board of managers should have only the authority of receiving the applications for life membership on the payment of twenty-five dollars. They would further suggest that no candidate should be admitted as a member who has not arrived at the age of twenty-one years.

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The following is the number of members belonging to the Institute:

Honorary members		85
Corresponding members		248
Life members	1,397	
Less deceased	256	
		1,141
Annual members		2,133
		3,607

JAMES H. DRAKE,
S. R. KROM,
JOHN W. CHAMBERS,
Committee.

Report of the Board of Managers of the Thirty-ninth Annual Exhibition of the American Institute, 1870.

The board of managers of the thirty-ninth annual exhibition of the American Institute respectfully submit the following report:

At their first meeting, held February 21st, 1870, the board was formally organized by the election of Hon. Orestes Cleveland, Chairman, Mr. William H. Butler, Vice-Chairman, and the appointment of Mr. John W. Chambers as Secretary.

The Empire Rink having been secured by our predecessors, under authority granted by the Institute, for this exhibition, not only reduced the labors of the managers, but materially facilitated the early apportionment of space for the several departments, perfecting proper grouping and classification of the various articles, and early notification of the many exhibitors.

The amount of rent paid to the Empire Rink corporation, also to owners of adjoining property, and insurance upon buildings where risk had been increased, was $8,189.56.

The buildings for working machinery, together with the many and seemingly endless alterations and repairs, cost $5,571.98.

When completed, the space covered was three acres, which, considerable as it appears, was not enough by one-third to properly display the articles within the buildings, and give the proper width of aisles. At least double the space could have been well filled.

The question of properly lighting premises so large was one of the most serious of the many which engaged our attention; to light well and economically being the problem. Inasmuch as it was not known where the next exhibition would be held, any large outlay for reflect-

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ors or other apparatus known to be efficient as well as economical, did not appear warranted; consequently a large proportion of the gas paid for was not properly and fully utilized, as it might have been under conditions more favorable. The amount expended for extra gas pipe, burners, labor, fitting and gas supplied being $6,251.67.

In our efforts to make the exhibition popular, and as much a place of resort as possible, we expended liberally for music, and freely advertised promenade concerts, which proved not only satisfactory to our visitors, but aided largely to increase our receipts; the cost of same, $3,416, is believed to have been judicious. So well satisfied are we upon this point, that we do not hesitate to recommend to our successors even greater liberality in this direction.

In consequence of the early notices issued to the inventors and producers of our country, applications for space were made as early as the 12th May, and increased to the day advertised for the reception of goods, when it was found that more space had been applied for than was at the disposal of the managers, but by reducing the same, and placing with compactness, all were finally received.

The total number of entries made and accepted was 1,678, and were for the departments as follows:

1st	department,	Fine arts and education	145
2d	"	The dwelling	380
3d	"	Dress and handicraft	145
4th	"	Chemistry and mineralogy	189
5th	"	Engines and machinery	305
6th	"	Intercommunication	245
7th	"	Agriculture and horticulture	269
	Total		1,678

Under many of these entries a large number of articles were exhibited, of the same class, but of different character, increasing to a great extent the variety and general attractiveness of the exhibition.

At noon, September 7th, the exhibition was formally opened by the Hon. Orestes Cleveland in behalf of the managers, and able and eloquent addresses were delivered by Hon. Horace Greeley, president of the Institute, and by Dr. Geo. B. Loring of Salem, Mass. During the exhibition, John L. Hayes, Esq., of Boston, Mass., read an able and instructive paper on the solidarity of the industries, as illustrated by the relations of the woolen manufacture, and by A. W. Humphreys, Esq., on iron manufactures; and Professor Silliman of New Haven, Conn., reviewed the progress of American industry in an earnest and interesting manner.

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The president of the Institute delivered the closing address, contending that the day was not far distant, when under favoring conditions we would manufacture nearly everything in our catalogue of wants.

One hundred and forty gentlemen, considered competent to act as judges upon the merits of competing articles, were appointed by the managers, upon whose reports, often requiring long and tedious labor, and to whom the managers desire to return their thanks; the following premiums were issued:

First medals and diplomas	246
Second medals and diplomas	58
Certificates of honorable mention	550
Total	854

Several exhibitors claimed the grand medal of honor, but in the opinion of the undersigned, nothing was exhibited so entirely original or important as to warrant us in granting it; although many exhibitions were made of new, useful and ingenious inventions and products; the one which proved most attractive was the ice making apparatus of M. J. Bujac, in connection with which he had ingeniously arranged a skating pond upon which those skilled in this beautiful pastime had full opportunity to practice their art. Upon authority granted by the Institute at its regular meeting, November 3, the Empire Rink was leased by the managers for the fortieth exhibition, to be held in the fall of 1871, and the preliminary steps have also been taken in reference to such exhibition.

The enormous amount of detail and labor which devolves upon your managers, not only in preparing for an exhibition, but as well during its progress and after its close, and in the belief that it could be rendered better and more profitable by the employment of a person fitted to act under the direction of the board, they applied to the institute for authority to employ a superintendent of exhibitions at the December meeting, which was granted; since which time they have secured the services of Mr. George Francis Dawson, formerly a most energetic and active manager, for one year, upon the terms stipulated. He is now actively employed in the interest of the Institute, and the managers doubt not but that his skill and labors will largely benefit the exhibitors.

Herewith we submit the accounts relating to receipts and expenditures.

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The receipts and expenditures of the exhibition have been as follows:

Receipts.

Total receipts at the doors, including season, mechanic, excursion, and school tickets	$62,461 65
Entry fees	3,679 00
Stands, privileges, restaurant, catalogue, etc	5,765 25
Exhibitors, gas consumed, and carpenters' work	167 86
Third and second avenue railroads	1,166 66
Sales of sundries	68 20
Amount to be accounted for	$73,308 62

Expenditures.

Committee on location, rent of rink, lots, and insurance		$8,189 56	
Committee on carpenters' work and buildings, buildings for machinery, ice building, and covering entrance	$3,202 38		
Lumber	1,083 18		
Hardware	226 97		
Carpenters	1,059 50		
		5,571 98	
Committee on police, light, music, and decorations, police, firemen, and watchmen	$1,177 45		
Light, gas, gas fitting, labor	6,251 67		
Music—bands and organ	3,416 00		
Decorations, covering tables, etc.	463 61		
		11,308 73	
Committee on printing and invitations, printing, circulars, posters, tickets, etc	1,204 45		
Stationery, blank books, paper, cards, postage, etc	413 12		
Bill posting	169 34		
Advertising	5,124 47		
		6,911 38	
Committee on finance and tickets, ticket sellers, receivers, etc		1,572 75	
Committee on steam engines, machinery and fuel	$1,807 11		
Use of boilers, shafting, steam fitting, belting, water, etc	3,094 99		
Superintendent, consulting engineer, etc	599 45		
Carried forward	$5,501 55	$33,554 40	$73,308 62

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Brought forward.....	$5,501 55	$33,554 40	$73,308 62
Testing engines, boilers, and pumps.....	325 43		
Laborers.....	449 50		
		6,276 48	
Clerks, superintendent and laborers pay rolls,		5,803 34	
Committee on signs and banners, signs, banners, etc		698 17	
Committee on refreshments, refreshments for managers and guests	$1,340 57		
Judges	606 58		
Ice for coolers	21 88		
		1,969 03	
Premiums.			
Medals and cases.....	$537 25		
Diplomas	140 00		
Horticultural appropriation.....	536 00		
		1,213 25	
Miscellaneous.			
Chemical tests.....	$116 85		
Insurance on buildings and fixtures	297 00		
Ice machine.....	188 35		
Incubator	100 00		
Fire balloons	110 00		
Use of crockery and glass for horticultural exhibition	66 13		
Badges	58 75		
Railroad tickets.....	126 88		
Painting, kalsomining, glazing, etc.	552 60		
		1,516 56	
			51,031 23
			$22,277 39
Cash paid treasurer American Institute			22,000 00
Balance on hand January 31st, 1871.....			$277 39

To which should be added the property purchased this year and on hand, available for future exhibitions.

Building extended from the machine arcade (built last year) to the Second avenue, and roofing the entrance from the Third avenue, lumber, etc.....	$2,500 00
Steam, water and gas pipes, and fixtures.....	1,000 00
	$3,500 00

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There are still some outstanding claims against the managers for the following:

Steam and gas fitting	$190 54
Services of engineer, test of steam engines and boilers	125 00
Emptying sinks at the rink	60 00
Advertising	17 50
Premiums—new certificate of honorable mention, engraving medals, filling diplomas and certificates, not yet completed	580 00
	$973 04

The buildings and property of the Institute at the rink have been insured in four companies until December, 1871:

On buildings	$5,100 00
Fixtures	3,000 00
	$8,100 00

In closing our report, we cannot forego the pleasure of congratulating the members upon the unprecedented success of the exhibition of 1870, not alone as to its profits in dollars and cents, but as well its freedom from any unfortunate or serious accident or loss to person or to property. We believe that the coming exhibition will surpass this, as much as this has surpassed the one which preceded it.

The immense expense which is involved in holding our exhibitions upon property not our own is well illustrated by a reference to its items given in the first portion of this report. We think we do not over-estimate when we state that a few of the items of saving would be about as follows:

Annual loss in temporary buildings and alterations	$5,000 00
Annual loss in temporary gas-fittings, alterations, and excessive consumption of gas, the result of imperfect arrangements	3,000 00
Annual loss in temporary shafting, putting up of same, water and steam pipes altered and changed	2,500 00
Making in these alone an annual loss of fully	$10,500 00

Throwing out of the calculation the numberless expensive changes and repairs constantly making, all of which are lost upon the closing of the exhibition.

Could we secure a permanent location, place therein an engine with

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boilers of our own, and start promptly upon the opening day, we should make a saving of at least $12,000 per annum, better satisfy the public, and have the satisfaction of knowing that every dollar expended in improvements would add to our future benefit, and serve our present wants as well.

The accounts and vouchers have been examined by the finance committee of the Institute, in accordance with the requirements of the by-laws, and have been certified by them as correct.

All of which is respectfully submitted.

ORESTES CLEVELAND.	JOSEPH B. LYMAN.
WILLIAM H. BUTLER.	J. TRUMBULL SMITH.
J. GROSHON HERRIOT.	WALTER SHRIVER.
CHAS. WAGER HULL.	THOS. D. STETSON,
WILLIAM S. CARPENTER.	JAMES R. SMITH.
GEORGE TIMPSON,	CHARLES E. BURD.
J. WILSON STRATTON.	E. S. DICKINSON.
JAMES KNIGHT.	CHAS. H. CLAYTON.
THOMAS HICKS.	HENRY J. NEWTON.
THOMAS RUTTER.	ALEX. M. EAGLESON.
SAMUEL R. WELLS.	FRANK EVERDELL.
WILLIAM E. PEARSE.	THOMAS VARKER.

ALLEN SETTLEMENT.

The Farmers' Club of Allen Settlement is in good working order; meeting every Friday evening to discuss subjects pertaining to agriculture. The meetings receive better attendance than usual; consequently, the discussions are of greater interest.

On the first Friday evening of each month (during the winter season) we invite some one from abroad to deliver us an address upon some agricultural or scientific subject. During the summer season the Club meet al the residence of one of its members, look his farm over, and spend the afternoon with him; then, by invitation of some member, adjourn to his residence the next month; and so on through the season. We think this an excellent way for farmers and their families to spend an afternoon once a month.

The reports from the State Society, Institute, and the Agricultural Report from Washington, are distributed among our members, save one for the library.

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At the first regular meeting, November 4th, the following officers were elected for the ensuing year: President, W. A. Mareau; Secretary and Treasurer, Belden Allen.

BELDEN ALLEN,
Secretary.

ANNSVILLE AND LEE.

The fourth annual fair and exhibition of the Annsville and Lee Industrial Association was held at Taberg on the 4th, 5th and 6th days of October, 1870, and was a gratifying evidence of a largely increasing interest in the affairs of the association.

The exhibition of articles competing for the very small premiums, which the state of the finances of the society enable them to offer, was very largely in advance of any preceding year; and yet, in consequence of unfavorable weather a portion of the time, the receipts were much less than might otherwise have been expected.

The gross receipts for the year, as appears from the treasurer's report, were		$559 75
Paid for premiums	$274 25	
Expenses for printing, repairs on buildings, fences, police, etc	285 69	
		559 94

The officers elected for the current year are as follows, viz.: Ebenezer Robbins, President; Benjamin Waterman, Treasurer; Julius C. Thorne, Secretary.

JULIUS C. THORNE,
Secretary.

BAINBRIDGE.

The Bainbridge Agricultural Society was organized January 3, 1857, under the act of the Legislature passed April 13, 1855. The first fair was held September 17, 1857, at the village of Bainbridge. The second, September 9, 1858, at the village of Afton. Annual fairs were held by this society, alternating between Bainbridge and Afton, until the breaking out of the rebellion. Since then our organization has been kept up by the election of officers each year, and by meeting in the way of a farmers' club during the winter. Our library has been preserved, so that we have almost a full set of the Transactions of the State Agricultural Society, Transactions of the American Institute, and agricultural reports of the Patent Office, and other books presented to the society.

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The officers elected at the last annual meeting, held at the hotel kept by D. Beals, in the village of Bainbridge, on the third Saturday of January, 1871, were as follows: Robert Pearsall, President; Joseph Juliand, Secretary and Treasurer.

JOSEPH JULIAND,
Secretary.

BROOKFIELD.

The Brookfield Agricultural Society continues prosperous, and has entered its twenty-second year. The last fair held on the society's grounds was one in which more than usual interest was manifested. The display in all departments was good, and in some far better than in former years. The show of horses was better than was anticipated, farm and carriage horses predominating. The stock show was all one could expect. The display of the Ayrshire stock is increasing, and it is hoped ere many years to see herds of thoroughbred animals of this kind, the same as we now see of the Devons and Short-horns. A little more interest in the sheep and swine department would add much to the show, for we have in this town abundance of material to make the display complete. In the tent was found a large assortment of everything that is usual at fairs, and we could almost imagine our town was located in the Genesee valley for the handsome flowers and fruits, vegetables and grains had arrived at such a state of perfection as is usual for them farther west and south. The mechanic is not forgotten at the fair nor does he forget the farmer; there are many premiums offered for the various articles which the ingenuity and skill in this town manufacture to perfection, and such articles we always have at the exhibitions, and the past year was not an exception.

The financial condition of the society is as follows:

Balance from last year	$45 10
Receipts	601 40
	$646 50

Disbursements.

Paid loan	$113 43
Paid premiums and expenses	458 68
Balance in treasury at date	74 39
	$646 50

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The following were elected officers at the annual meeting, for 1871: President, Heman A. Brown; Secretary, George H. Babcock; Treasurer, Henry Brown.

GEO. H. BABCOCK,
Secretary.

CASTLE CREEK.

Below you will find list of officers for the Farmers' Club of Castle Creek for the ensuing year: President, Isaac Emens; Corresponding Secretary, J. P. Adams; Treasurer, James Gaylord; Chorister, Frank Blair.

Number of members forty-five. Meet regularly on Friday evening of each week.

J. P. ADAMS,
Corresponding Secretary.

CLAY.

The annual fair was held on the societys' grounds in Centreville, Wednesday and Thursday September 14th and 15th, 1870. The receipts during the year were as follows:

On hand from last year	$7 00
Memberships at the annual meeting	11 50
State appropriation	82 87
Richard Platt note paid	41 00
Membership tickets	1 50
Receipts at the gate during the fair	273 13
Membership tickets	17 75
Cash from L. Herrick	20 00
License to sell confectionery	5 00
Membership tickets and entrance fees to the trot	25 00
	$484 75

DISBURSEMENTS.

Premiums for 1869	$31 75
Premiums for 1870	156 25
Expenses	248 31
Cash on hand	48 44
	$484 75

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The officers for the current year are: M. H. Blynn, Cicero, President; L. Harris Browne, Plank Road, Secretary; Isaac Coonley, Cicero, Treasurer.

L. HARRIS BROWNE,
Secretary.

CONSTANTIA.

The Constantia Agricultural Society held their fourteenth meeting on the grounds occupied by them, situated on the shore of Oneida lake, on the 14th and 15th of September, 1870. The first day was propitious, and an exceedingly large number of people attended. The entries made far exceeded those of any previous year. The stock called forth much attention. The marked improvement in the various breeds, to which the farmers in this locality have been for some time directed, seemed plainly discernible and much rivalry was manifested. Grains and vegetables made a conspicuous show. Oats and rye appeared to be the dominant cereals, though the display and quality of the wheat was excellent.

The mechanical department and floral hall cannot be overlooked. Much commendation was elicited from persons visiting these halls. The various improvements made in all branches of agricultural implements were clearly discernible, and appreciated by persons visiting the grounds.

The quality of wool on exhibition was good. Elijah Hallenbeck, who some two years ago imported valuable stock, has clearly made a great revolution, both in quantity and quality, of yield of this article.

It is determined now to hold the fair three days instead of two, devoting the first day exclusively to entries, owing to the press of business the shorter time being found inadequate to afford persons an opportunity of proper inspection.

The officers of the society are as follows: James A. Baker, President; Frederick C. Lander, Secretary; Jerome Taylor, Treasurer.

FREDERICK C. LANDER,
Secretary.

CUBA VALLEY POINT.

The society held its annual meeting for the election of officers at Cuba, N. Y., June 21st, 1870. J. W. McWharter was chosen chairman and G. H. Swift secretary.

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E. D. Loveridge was elected President, George H. Swift Secretary, and James A. Story Treasurer of said society for the ensuing year.

The society held one fair during the current year, on the 5th, 6th and 7th days of October, 1870.

The following are the receipts and expenditures of said society from the date of the last annual report, January 20th, 1870, to the date hereof, viz.:

Balance on hand at last report	$492 27
Interest on money invested	34 45
Sale of annual membership tickets	764 34
Life membership certificates	60 00
Entrance fees at fair	1,728 50
Entrance fees of horses	547 50
Rent of grounds	133 00
Donations	30 00
	$3,790 06

EXPENDITURES.

Purses paid horses to trot	$1,465 00
Premiums	491 00
Printer's bill	124 95
Police constables, gate-keepers and assistants	138 65
Band of music	67 00
Secretary's expenses, postage, ribbons and incidentals	94 92
Expenses fitting fair ground and keeping stock	207 23
Paid for use of grounds	250 00
Expense of erecting new building on ground	444 82
Incidental expenses	6 77
Balance in treasurer's hands	499 72
	$3,790 06

The fair was an entire success, and our society is in a flourishing condition.

GEORGE H. SWIFT,
Secretary.

DANBY.

The Danby Farmers' Club was organized January 7th, 1859, with about twenty members, and has continued its organization since that time, with a gradual increase of membership, which numbered *sixty* the past year.

Regular meetings are held every two weeks, from the 1st of November until the 1st of May, and once a month from May to

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November, for the discussion of subjects pertaining to agriculture and the mechanic arts. These meetings have been well attended during the year, and more interest manifested in sustaining the objects of the organization than heretofore.

The officers have performed their duty without fee or reward, except the consciousness of having tried to promote improvements in agriculture as opportunity offered.

The club has received from the department of agriculture, at Washington, packages of seeds each year, for several years past, some of which have proved valuable, and many otherwise.

During the year just closed a new impetus has been given the club by holding two public festivals, viz.: A sheep show and sheep shearing, at Danby village, on the 28th day of May, and their first annual fair, on the 8th day of September. At the sheep show over 300 animals were exhibited, comprising a *few* good representatives of long-wool, middle-wool and fine-wool varieties, together with a multitude of mixed breeding of only medium quality. No money was paid in premiums, but diplomas awarded to animals of superior merit in their respective classes.

By invitation, Hon. Ezra Cornell delivered an instructive address to the assembled farmers. Referring to the State census of 1865, he brought to view the shortcomings of the Danby farmers, as compared with other portions of Tompkins and adjoining counties, showing that we were far below in grain crops, and only a respectable average in dairy products, potatoes and live stock.

The first annual fair was held at the town hall, and on grounds adjacent, on the 8th day of September. The number of exhibitors was 137; number of entries for premiums 361, besides many articles not entered for competition.

The ladies, as they always do, bore off the palm, in the tasteful arrangement and decoration of their department.

Fat cattle and sheep were not numerous, but of superior quality. Mr. John J. Johnson exhibited a mammoth steer, four years old, raised and fed by him, the live weight of which is reported at 3,260 pounds. Working oxen made a fair show, as did other farm stock, particularly horses and mules. The potato crop had some most huge representatives, showing remarkable success in growing that valuable esculent. As at the sheep show, no premiums were awarded in money, but diplomas given for the best articles and animals in each class. A fine display of labor-saving machinery for the farm and household was made by A. H. Grigg, Esq., of Ithaca.

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The receipts and expenditure of money during the year have been only $78.84, showing how much may be accomplished with a small outlay of cash, where all unite for the general good and work with a will.

Officers elected for 1871 are: President, Levi C. Beers, Danby; Treasurer, Sheldon Frazier, Danby; Corresponding Secretary, E. L. B. Curtis, Danby.

E. L. B. CURTIS,
Secretary.

DELHI.

The year has not been a favorable one for this society. The unprecedented high water in the fall of 1869 destroyed a large portion of the fences, and materially injured the track and grounds, very much increasing the expenses of the society.

The annual fair was held on the society's grounds the 29th and 30th days of September. The premium list was liberal, and everything indicated a successful season. The first day of the fair was pleasant, with the usual number of entries. There was also a good attendance, and the exhibition of stock of all kinds, with the usual variety of implements, vegetables, poultry, ladies' handiwork, etc., indicated a large concourse the next day. The elements, however, were against us. The only thoroughly rainy day for several weeks, both before and after, was the second day of our fair, rendering it pecuniarily almost a failure.

Under the circumstances, the officers and directors deemed it expedient to have another day at a future time for the exhibition of horses, trial of speed, etc., which was held on the 12th of October. This resulted favorably, and netted the society something over $150 over expenses, yet it was not enough, with previous receipts, to pay the large expenses and premiums without increasing the debt about $200.

Last year, as then reported, we had two fine days, and the receipts were sufficient not only to pay premiums and expenses, but to reduce the debt $400 and a small surplus left.

The society is, however, in prosperous circumstances, owning about six acres of good land, with new and commodious buildings, worth more than three times its indebtedness.

The officers of the society for 1871 are: Jesse Palmer, President; Jonas M. Preston, Secretary; Anthony M. Paine, Treasurer.

ANTHONY M. PAINE,
Treasurer.

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DUNDEE.

Our society has excellent grounds, with all necessary buildings, and is in a flourishing condition.

Our exhibition of stock, grain fruit, etc., was admirable. Our land is excellent and well tilled. Crops of grain of all kinds the present season are bountiful. The prospect for fruit (except grapes and pears, which are abundant) is not so flattering.

On the whole, our farmers are very prosperous, free from debt, and the real lords of the land.

GEO. P. LORD.

EAST MAINE.

The officers chosen for 1871 are as follows: President, Abm. H. Green; Corresponding Secretary, Robert Hogg; Treasurer, James G. Hogg.

We have no financial report to make, as the annual dues of the members, and the expense of lights and stationery about balance.

Since the organization of the society, twelve years ago, it has hardly ever failed to meet, once a week, from the first of November till the first of April, and discuss a given subject; and on the first meeting of each month we have a speaker from abroad to deliver an address. These are denominated the jubilee meetings, and the house is always filled. Since the last report there have been five addresses delivered before the club, each of the very highest order, full of entertainment and instruction.

The weekly meetings, the monthly address, the receipts of about thirty volumes of Transactions of the Agricultural Society and American Institute, the monthly and annual reports of the agricultural department, at Washington, seeds, etc., etc., all seem to work together to make the club a useful and necessary institution.

ROBERT HOGG,
Corresponding Secretary.

EDMESTON AND BURLINGTON.

Receipts and disbursements of the Edmeston and Burlington Agricultural Society for the year ending the second Tuesday of January, 1871:

Receipts for the year $993 24

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DISBURSEMENTS.

Premiums awarded	$437 85
Paid for tent	250 00
Use of ground for fair	60 00
Band of music	40 00
Printing and police force	73 00
Incidental expenses	58 60
Balance	73 79
	$993 24

WILLIAM LINES,
Treasurer.

GALEN.

The Galen Agricultural Society held its annual meeting at the office of T. Robinson (our society's rooms now in course of construction not being in readiness), when the following officers were duly elected for the present year: Joseph Watson, President; Seth Smith, Treasurer; William H. Peckham, Secretary.

Treasurer reported balance on hand January 1st, 1870	$63 02
Memberships received	122 00
Admission at gate	61 41
	$246 43

Cash premiums	$143 00
Expenses	73 74
Cash on hand	29 69
	$246 43

I would like to impress upon your mind that ours is strictly an agricultural society. We allow no trotting or racing of any kind at our fairs, believing it to be injurious to the successful operations of agricultural societies.

WILLIAM H. PECKHAM,
Secretary.

GARRATTSVILLE.

The Garrattsville Agricultural Society was organized in the year 1860, for the purpose of promoting the interests of the agriculturists in the town of New Lisbon and her sister towns. Judging from the

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fact of its continued existence and apparent prosperity at the present time I have no doubt but that the first exhibitions of the society were successful. I have no data by which to judge of the success of the exhibitions of the society prior to the year 1866. Since that time our annual exhibitions have been well patronized, and our annual receipts from $350 to $575. We have a very fine and pleasant fair ground which has been leased for a term of years, and on which has been erected a large and respectable, commodious fair building. The grounds leased by the society contain about twelve acres of land lying on the banks of the Butternut creek. Arrangements are now being made for the inclosing of the grounds with a tight board fence, eight feet in height, with the intention of making the society a successful and permanent institution.

Our annual exhibition for 1870 was held on the 5th and 6th of October. The lateness of the season was detrimental to the interests of the society; but we could not, without coming in conflict with other societies in the county, hold it earlier in the season. The attendance was very large considering the lateness of the season and the large number of town agricultural exhibitions which had been held in different sections of the county, together with the exhibition of the county agricultural society, for every one had in fact become surfeited with them. The first day was devoted to the exhibition of cattle and sheep, and the filling up of domestic hall with the many and varied articles of manufacture by the farmers' daughters of our town.

The show of cattle was not as large as at some former exhibitions of the society. There was a fine display of Devons from the farm of our townsman, Jonathan W. Neff. Robert B. Hume and Thomas Rutherford entered some very fair Short-horns, and Thomas Rutherford carried off nearly or quite all the premiums on Ayrshires. The principal contributors to the common stock class were Adam H. Elliott, Robert B. Hume and Samuel J. Austin, and for common stock they were unexceptionable.

In quality the sheep on exhibition have never been surpassed at any exhibition ever held in the county, not even excepting the exhibition of the county society. The South Downs from the stock of Jabez Collins of the town of Morris, the Merinos from the stock of C. D. Pope, of this town, the different pens of Cheviots, owned by James Elliott, James Bell, John Hall and Robert B. Hume, and the Leicesters lately imported from Canada by our townsman Adam H. Elliott and A. A. Mather, of Burlington, might cause a stranger to apply to us the epithet that we looked somewhat sheepish; too much

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praise cannot be awarded to the two last named gentlemen for the expense incurred and the pains taken by them to aid in improving the quality of sheep in this section of the county. The display of horses upon the second day of the fair has never been surpassed in this county. The Hambletonian stallion owned by E. P. Judel, of the town of Otsego, to whom was awarded the first premium, is a horse perfect in all his parts, and called, by competent judges of horse flesh, one of the finest horses in the county. Of matched teams, sixteen entries were made, and none of them but were more than ordinary horses. There were present at our exhibition horse dealers who were in yearly attendance at our State fairs, who were compelled, from what they saw, to acknowledge that they seldom saw a better display of matched teams at any of our State fairs. The entries of single horses, breeding mares and colts were quite large. The display in domestic hall was very attractive, and added much to the pleasing features of our fair. The display of vegetables was not equal to former years; and in fruits we had no entries, where, generally, we have a large variety. The fruit and vegetable crop having been very materially lessened by the drought which prevailed to such an alarming extent in this section of the county during the past summer.

RECEIPTS.

Membership tickets	$350 00
Use of grounds during fair	50 00
Tickets sold at door, etc.	79 50
	$479 50

EXPENDITURES.

Premiums	$255 75
Speaker	15 00
Secretary	15 00
Treasurer	15 00
For use of grounds	50 00
Printing and other expenses	128 75
	$479 50

Leaving, as you see, our treasury entirely empty, but with a determination on the part of the members to never say fail.

At our annual meeting held on the second Tuesday in January, for the election of officers, the following officers were elected for the year 1871: President, Thomas Laidler, Garrattsville; Secretary, W. J. Kellogg, Garrattsville; Treasurer, Hiram C. Potter, Garrattsville.

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Our annual exhibition for 1871 is to be held on the 27th and 28th of next September.

W. J. KELLOGG,
Secretary.

GENEVA HORTICULTURAL.

Receipts and Expenses of Geneva Horticultural Society for 1870.

Received for membership and proceeds of exhibitions.....	$408 85
Amount due S. M. Anthony, treasurer.....	15 05
	$423 90

Paid rent of room for weekly meetings.....	$112 00
Paid premiums, expenses of exhibitions, and other expenses,	311 90
	$423 90

In addition to the above, premiums amounting to about $150, which were awarded by the committees at the exhibitions, were donated to the society by the recipients, and not included in the treasurer's account.

We held two exhibitions during the year, which were very successful, at each of which an address was delivered, in June, by the Hon. Hugh T. Brooks, and in September by P. Barry, Esq. Mr. Barry's address on lawns has been very widely disseminated through the horticultural and agricultural journals, and has been so widely praised that nothing more need be said here about it. Col. Brooks' was in his most happy vein, and was an unique affair, and a real rich treat to hear. During the winter, weekly meetings are held, at which a number of valuable and instructive essays have been read, and some of them published in our local papers, and from them our horticultural journals have disseminated them throughout the country. Subjects of discussion have been also very instructive, and much valuable information has thus been brought out. The Geneva Horticultural Society is a live and active society, and our reputation has become so extended that horticultural journals from different sections of our country have solicited reports of our doings for publication.

Our next exhibition will be held September 20th, and we expect a successful and profitable affair.

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At the annual meeting, held January 9th, the following persons were unanimously elected officers for the year 1871: William Hall, Geneva, President; and George S. Conover, Geneva, Secretary.

GEORGE S. CONOVER,
Secretary.

GLEN SPRING.

The Glen Spring Farmers' Club is enabled to report *progress* during the past year, though the depressing influence of a bad season for farmers has to some extent affected us. Our membership has slightly increased, and a good interest continues to be felt in the weekly meetings of the club. During the year we have increased the number of volumes in our library from ninety-five to 146, and have had book cases constructed with a capacity of holding about 400 volumes, which we propose to fill as rapidly as our means will allow. The club held its second winter fair on the 29th of last December, which proved to be the most inclement day of the whole season. As a consequence, the display was not as good, nor the attendance of visitors as large, as last year. Having demonstrated our ability to hold a *good* fair, we shall abandon the novelty of a winter exhibition, and hold a fair during the fall.

The annual address was delivered before the club, January 19th, by Hon. R. H. Williams, of New York.

The officers for the year 1871 are as follows: President, James F. Reynolds, Penn Yan; Secretary, Gilbert D. Baker, Himrods; Treasurer, William W. Buxton, Milo Centre.

In conclusion, we congratulate the State Society on the progress they are making in their encouragement of the farmers of this great State; and, for ourselves, enter upon the new year with prospects bright for 1871.

G. D. BAKER,
Secretary.

GOUVERNEUR.

Taking it for granted that the results attending rather than details of preparation for our last annual exhibition, are the principal matters of interest, I proceed at once to give an account of the twelfth annual fair of this society, held September 14th, 15th and 16th of the year just closed.

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The season was most unfavorable for agricultural pursuits, which, added to the low prices of products, argued anything but a liberal display of either products or people, and yet I think it may be safely asserted that, notwithstanding all this, the exhibition was in most respects more successful and more encouraging than that of any previous year.

Although every department was not full, the average was good, and a still more gratifying feature was the excellent quality of nearly all the objects exhibited, few having been entered simply to swell the number of entries but rather because worthy to compete for the premiums offered.

In this latter respect the show was a decided success, and may be taken as evidence that our improvements have kept pace with our growth whether as a society or community.

Another encouraging feature attending our annual fairs is the gradual extending of their influence and reputation year by year to greater limits, and by judicious management our field of operation will continue to be enlarged. This year there were fourteen towns in this county, and others in Franklin, Lewis, Jefferson and Oneida counties represented by products and people at our fair.

There were in all about 800 entries, being considerably in excess of any previous year except the last.

In class one, division one (Ayrshire), there were twenty-two entries, a highly creditable number when we take into consideration three facts: First, these animals were nearly all from this almost immediate vicinity; second, our young society witnessed the advent of the first pure-blooded Ayrshire in this locality; and third, the extreme drought and excessive pride of many of our farmers kept a large number of this valuable breed of cattle at home. The fact was, however, established that we need not hereafter count the herds of foreign stock growers to insure a first-class show of Ayrshires at our fairs.

One solitary Durham honored our exhibition with its presence (and that a yearling bull from an adjoining county). If this animal grew to its unusual proportions in an attempt to compensate for the lack of numbers exhibited in this class, the effort was eminently successfull. I very much fear, however, that the question in this society will soon be not "have we a *Bourbon* among us," but rather, have we a *Durham* among us. Experience in other localities has demonstrated the value of Durhams for crossing with other breeds of cattle, and I think the experiment would prove profitable here. Devons, as such, have entirely ceased to be represented at our fairs.

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There were two Alderneys on exhibition, being an increase of one over last year. And here let me add, that while this diminutive race of cattle are not regarded as profitable when compared with others in a cheese dairy, yet a slight sprinkling of Alderneys in a butter dairy would no doubt add color and price to the products thereof, and with this view we may hope to see more of them at our fairs.

We had forty-two entries of grade cattle, and seventeen of native cattle; quite a falling off of the latter from former years, owing, I presume, to the fact that but little stock was regarded in "showing" condition last season.

In the three divisions of class two (horses) there were 115 entries, distributed as follows, viz., eleven stallions, forty-two brood mares and colts, and sixty-two roadsters, matched and draught horses.

The large number of entries in this latter division, and the experience of the past, suggests the importance, and I may say the absolute necessity, of further divisions in this class, in order that the work may be distributed among a larger number of committees; for, as heretofore divided, the labor was more than one committee could satisfactorily perform. I would recommend a division exclusively for roadsters, single and double (professional trotters to be excluded), their comparative merits to be tested on the track at an hour which would not interfere with the usual races. Much interest might be added to our fairs in this way by a friendly contest for the premiums, which need not be so large that the receipts would not reimburse the society for the expense.

Again, the large number of entries of the latter, in proportion to the number of teams presented to the judges for inspection, leads to the suspicion that, with many, the only card sought for is the one honored and respected by the gate-keeper; or, in other words, a substitute for a "carriage card," which costs twenty-five or fifty cents.

Aside from the pecuniary loss to the society by this practice, there is a loss of time on the part of the secretary in recording the entries and filling up entry cards, and still more on the part of the judges in the vain search for teams corresponding to the list furnished for their guidance.

To remedy this, I would respectfully recommend the adoption of a regulation requiring all horses entering the fair grounds in harness to have a "carriage card" attached. Exhibitors to be reimbursed for the extra expense by larger premiums. Other agricultural societies have made a similar rule and for a similar reason, and it proved to be a good regulation.

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Horses seem to be a leading and prominent feature at our fairs, and as they are second in importance only to one other product of this section, every encouragement should be extended to exhibitors in this class, and at the same time the society should be protected against imposition and loss.

The show of sheep was remarkably slim, there having been but nine entries. Perhaps a more liberal offer of premiums might improve the display in this class; at least the desired end is worthy the experiment.

In class four (swine) there were but eleven entries, and here again is abundant room for improvement. We have several breeds (so called) of swine, while we offer premiums without any distinction. To insure a better display, there should be at least three if not four divisions in this class. Say, Chester Whites, Cheshires, Suffolks, and mixed.

In class five (butter and cheese) there was a very commendable display, considering the season, and the judges expressed themselves much pleased with this department. A condition of receiving a premium in this class was, that the person so entitled should, if required, make a statement of the method of manufacture of the butter or cheese for which a premium was awarded, the object being to find an approved article, and then, for our general benefit, to learn how it was produced; but, as no one has intimated a desire for such statements, none have been made.

It would seem that, while these products bear such an important part in the business and prosperity of this locality, and while their production is regarded of sufficient national importance to warrant the formation of an American dairymen's association, composed of the leading agricultural men of the land, that more interest and greater prominence might be given to this subject by this society. We have not, I think, as a general rule (even of individual cases), reached the acme of perfection in the manufacture of butter and cheese; and now that agriculturists of other sections, heretofore devoted almost exclusively to grain growing, are turning their attention to this subject in a practical way, it becomes even the farmers connected with this society to endeavor to put a "gilt edge" on every package of butter and cheese they send to market, in order to be above and beyond this new competition.

The annual plowing match, which comes under the head of class six, was held on the Peter Van Buren farm, October 18th. There were two competitors in the men's class, and three in the boys' class:

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and a very few spectators present. The day was altogether unfavorable, which doubtless accounts for the small attendance.

In class seven (mechanical department), there were eighty-seven entries, nearly double the number of last year, and better still, nearly every article was of practical utility, as well as meritorious in workmanship and design. I think this department was never so well filled.

The same is true of class eight. In division one (household products), there were sixty-three entries, an increase of 100 per cent over last season. In division two, same class (needle work), there were seventy entries against thirty the year before; and in division three (paintings), I am able to report forty-five entries, where we had but twelve last year.

This last named class is patronized almost exclusively by the ladies, and occupies a large space in what we call floral hall, and which may be said to form the most attractive feature of our fairs; at least, a fair without a floral hall would be regarded as a small affair, and a floral hall without the handiwork of fair hands to beautify and adorn it, would present a sorry appearance indeed. From which may be seen the necessity of cultivating the good will and kind offices of the ladies, not only by offering liberal premiums for specimens of their skill and industry, but by providing a suitable building in which these may be displayed with safety and advantage.

In class nine, we had forty entries, being more than double the number in this class the year before, and nearly all so good, that the judges experienced difficulty in deciding as to which were best.

In class ten (grain and garden vegetables), the exhibition was equal in point of numbers and variety, to any previous display of these productions by this society, which is saying a good deal, besides demonstrating that even a severe drought cannot spoil our show in this department.

The exhibition of poultry (class eleven), was also as good, if not better, in some respects, than heretofore, and the increasing interest in the raising of choice varieties of domestic fowls, justifies the expectation of our doing still better in the future in this class.

In class twelve (fruit and flowers), there were forty-two entries, being a slight increase over former years, but nothing to boast of. This deparment needs a good deal of nursing and requires no little effort on the part of the officers of the society, to get out what little we have displayed in this class. This lack is, no doubt, owing in part to the unfriendly nature of our climate; but I suspect that a little more energy and perseverance on the part of our people, or even a

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little more liberality in contributing of what we have in this line, would make this department appear quite creditable.

Class thirteen, being almost exclusively for those who have musical instruments, sewing machines, silver ware, millinery goods and kindred articles to dispose of, will take care of itself so soon as the society provides a suitable building in which such property can be sure of protection against storms. This year the weather favored us, and exhibitors complained only of want of room; but made the most of what there was allotted to this department.

Class fourteen, or the discretionary class, for once assumed very modest proportions, there having been but ten entries against 150 the year before, a result very gratifying to the discretionary committee, to say the least, and growing out of a regulation adopted by the board of officers.

The annual address was delivered on the last day of the fair by Hon. Thomas G. Alvord, of Syracuse; and although not directly agricultural, was upon a subject closely allied thereto, viz.: "The relation of the producer to the consumer." The high reputation of the distinguished speaker was well sustained on this occasion.

Since our last annual meeting considerable repairs have been made on the track and two buildings erected on the society's grounds; one for the accommodation of stock, the other to serve as a vegetable and dairy hall. Both demanded by the increasing wants of exhibitors.

There has also been purchased, at a cost of $750, three shares of the fair ground stock, making in all seven shares now owned by the society and purchased in the last two years, and costing $1,750, and leaving three only in the hands of other parties; or, in other words, a debt of $750 on property worth at least ten times that amount.

It is very desirable that this indebtedness should be paid at the earliest possible day, in order that the funds of the society may be (so far as is necessary) applied to the erection of permanent buildings so much needed by the growing wants of this society. It needs no great amount of wisdom or foresight to prophecy that were the society free from debt and possessed of suitable buildings, much greater inducements could be offered, both in premiums and conveniences, and our annual fairs become more attractive and beneficial than now. And I indulged the hope that this last meeting would adopt some measure looking to the early accomplishment of so desirable a result.

The use of the dining hall and ground for one fruit stand was *given* to the Methodist society of this place; the board reserving the right to rent, through the superintendent, fruit stands to whomever might apply.

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This arrangement was found more profitable and satisfactory to the board than the policy formerly pursued in this matter.

Another pecuniary benefit was derived by hiring floral hall, trimmed and arranged, at a fixed price, without the usual unlimited supply of complimentary tickets, which heretofore had been lavishly distributed, in very many cases where no labor had been performed. The price paid for this work this season amounted to little, if any more, than the amount paid in money heretofore, while the value of tickets saved has been estimated at from one hundred and fifty to two hundred dollars, which, of course, was a clear gain to the society. I think I may truthfully add, that the work of trimming floral hall was never more tastefully performed, for which the ladies of Trinity church, of this place, are entitled to our thanks, in addition to the pecuniary reward given.

The society's thanks are also due Hon. H. N. Redway, of Potsdam, who for several years has made an annual donation to its funds of *five dollars.*

An effort is being made by the managers of the New York State Agricultural Society to obtain pecuniary aid from the State Legislature, with the view to secure permanent grounds and buildings in some central locality for the annual State fair. And the influence of this society has been asked, through some of its officers in favor of this project.

There are cities in this State, centrally located, that would gladly provide the necessary grounds and buildings, on condition that the State fair should be permanently located therein. And I do not think this society willing to recommend a tax upon itself, or this community for such a purpose, under the circumstances.

During the past year this society has sustained a loss, by death, of two of its active, worthy and highly esteemed members, viz., Rev. B. B. Beckwith and Charles G. Carpenter, Esq. The former was for many years (and at his death) chairman of the discretionary committee, and in all places a zealous laborer for the welfare of the society, while the latter, who was equally zealous and efficient in another department, was, at his decease, a member of the board of directors.

The pecuniary results attending our last fair, if not all that could be desired, were better than in any former year, and quite as good as could be reasonably expected.

It should be remembered that the funds of the society are obtained by collecting a small amount from each of a large number of individuals, and to insure pecuniary success, our exhibition must be made

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attractive to the public. But pecuniary success is only secondary, or rather a means to an important object, viz., the "improvement of agriculture and the mechanical arts" in our midst, and if we cannot look back thirteen years to the organization of this society, and mark our progress in these particulars, then have our labors been lost.

If it were possible, it would be interesting, and I think profitable, if members of this organization would, at each recurring annual meeting, note the improvements that have come under their observation, and in their experience during the year. And it would be especially gratifying to know that the efforts of this society had contributed in any considerable degree to those improvements. Then could its officers and members take new courage and put forth increased efforts that still greater benefits might result from their labors.

G. B. WINSLOW,
Secretary.

HAMILTON.

The fourteenth annual fair was held at Poolville, Madison county, on the 4th and 5th days of October, 1870. The amount of premiums awarded was $306.75. Amount of receipts, including memberships and contributions $441.00. Amount of surplus funds on hand $700.

O. B. LORD,
Secretary.

HAMMOND.

The exhibition commenced on the 30th day of September and closed on the 2d day of October, and resulted in a general success to the satisfaction of all present, notwithstanding the very unfavorable season for the products of the soil, the drought having been very severe in this locality during pretty much the entire summer.

The entry of stock was large in numbers and of good quality, more particularly horses, seventy-four entries being made in this class. Other varieties of stock were well represented and worthy of much commendation. Dairy products, butter in particular, were very fine and the display was large, nine premiums being awarded for butter alone.

In the line of vegetables there was seldom if ever a better show in quality or numbers, in fact, in every department there was evidence of improvement, industry and enterprise, which made the exhibition

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pass off with general and complete satisfaction to everybody present. Our receipts were not as large as many neighboring fairs for the one reason, that our rates of admission are far below those of any other society, fifteen cents for a single ticket or ten for a dollar, being the rates established in the organization and to which we have held, up to this time. The amount footed up to $560; $300 of which was paid in premiums, the remainder squared up the expenses of the society and canceled some outstanding debts, leaving a very small balance in the treasury.

I am glad to inform you that new life has sprung up in the surrounding country, the people's ambition has become aroused and we hope in the future to make our exhibitions more and more interesting.

Our present officers are: Jeremiah Ames, President; Irenus Franklin, Treasurer; C. A. Wooster, Secretary.

C. A. WOOSTER,
Secretary.

HIGHLAND.

Our Highland Horticultural Society has not held any exhibition the past year. It has expended, for additions to library, thirty-five dollars, and for incidentals perhaps ten dollars; balance of receipts from members' fees, etc., about five dollars.

We held weekly discussions last winter, and expect to have an exhibition about the middle of September.

THOS. H. BURGESS,
President.

ITHACA.

After lying dormant for eleven years, the Ithaca Farmers' Club again reports itself as one of the living agricultural institutions of the times. It resumed activity one year ago this day, aroused from its long silence by the spirit of progress awakened by the presence of Cornell University in the county. It was reorganized by the election of the following corps of officers:

President, Hon. Ezra Cornell; Recording Secretary, H. D. Cunningham; Corresponding Secretary, L. B. Arnold; Treasurer, O. B. Curran.

It has twenty-seven active members, composed of the professors of the university connected with the agricultural department of that

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institution, and progressive farmers in the vicinity, making a very desirable balance between scientific and practical agriculture. It holds regular meetings semi-monthly, for the discussion of questions relating to agriculture and the mechanic arts, with good audiences, and the essays and discussions, regularly reported for the press, are read with a lively interest by the surrounding community. It has a valuable library of about 1,000 volumes, and a large and interesting museum, arranged in rooms fitted up especially for them, by the munificence of its distinguished president, making them an attractive resort for visitors.

All the surroundings of the club look favorable, and give the appearance of permanency and usefulness.

L. B. ARNOLD,
Corresponding Secretary.

KIRKLAND.

At the winter meeting of this society, held at Tower's hall, in the village of Clinton, on Wednesday, January 11th, 1871, the following officers for the ensuing year were chosen: President, Charles W. Eells; Treasurer, John S. Tillinghast; Secretary, Roderick Morrison.

After some discussion, the constitution and by-laws of the society were so amended as to extend the membership to all residents of Oneida county, and inviting adjoining towns to compete for premiums.

RODERICK MORRISON,
Secretary.

LENOX.

The thirteenth annual fair of the Lenox Farmers' and Mechanics' Association (Madison county) was held on the grounds of the Park Association, Canastota, on the 8th, 9th and 10th of September, 1870. The weather was all that could be desired, the attendance large; but the society's liberal premium list of over $600, did not bring out the farmers and mechanics as exhibitors, to the extent desired and expected by the officers of the association. Still the exhibition was good in most of the classes. The number of entries was 298, and the uniform excellence of the animals and articles entered for competition was a subject of general remark. The amount of receipts was $800; premiums paid, exclusive of Transactions of State Society, but including other books and papers, $242.50. Our expenses were in excess

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of the receipts, but it is hoped that the aid to be received from the State will make up the deficiency.

The officers of the Lenox Farmers' and Mechanics' Association for 1871, are as follows: President, D. P. Lamb; Treasurer, T. F. Hand; Secretary, E. F. Lewis.

At the annual meeting of the association it was,

Resolved, That a permanent location for our State fairs ought to be selected, and that competition for the location should be limited to the cities of Syracuse and Utica, the city offering the best inducements to be selected.

The president and secretary were appointed delegates to the meeting of the State Society in February.

E. F. LEWIS,
Secretary.

LITTLE FALLS FARMERS' CLUB.

LITTLE FALLS, *August* 1871.

Corresponding Secretary New York State Agricultural Society:

DEAR SIR.—Please find in the accompanying papers the fourteenth annual report of the Farmers' Club of Little Falls. The papers were arranged by Hon. Josiah Shull of Ilion; and embrace the more important discussions of the club during the year. Hoping the report may be of interest, as embodying the experience of practical farmers in this section of the State,

I have the honor to be, very truly yours, etc.,

X. A. WILLARD.

COLORING DAIRY PRODUCTS.

The club held its second regular meeting for the month of October, at the court-house in Herkimer, Friday afternoon.

Hon. Josiah Shull showed some curiosities in vegetables. Some turnips, which were said to be fair specimens of his entire crop, had run nearly all to tops, and looked more like cabbage stumps, minus their heads, than like any kind of roots. One of the specimens was fully two feet in length, with a bulb very short and small. Other members of the club complained of a similar defect in their turnip crop this fall. The general opinion seemed to be that this defect was the result of the season, and not of culture or seed. Another curiosity was a sample of a second potato crop from this year's seed. The tubers were fair sized for a first crop, and of extraordinary size for potatoes from new seed.

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When the time for the regular discussion had arrived, Hon. Harris Lewis, who had been appointed to lead in the discussion, asked to be excused until the next meeting, as he had not prepared himself satisfactorily to speak as he wished to on the coloring of butter and cheese. The discussion on that subject was, therefore, postponed until the next meeting.

On motion of Mr. Countryman, of Herkimer, the methods of cooling milk before carrying to the factory was then taken up.

Mr. Countryman said he did not know of any effective means for cooling milk, yet he believed it was of the utmost importance that the milk should be cooled before starting for the factory, especially during the warm summer weather. He then spoke of the frequent arrival of tainted milk at factories in the summer, as the result of carrying milk in covered cans, in the sunshine, without the animal heat having been taken out. He believed this custom was responsible for much of the poor and tainted cheese. Sour or tainted milk might be made into cheese, and the cheese made to keep their shape, through the art of the cheese-maker; but the taint in the milk would be retained in the cheese.

One member asked if floating curds and poor cheese was not often to be attributed to rennets?

Mr. Countryman thought this not as common a cause as the impure condition of the milk itself.

Mr. Lewis said that floating curds are always the result of putrefactive ferment in the milk. This putrefaction might be brought about in various ways. He then gave his experience with floating curds when he made up the milk of his dairy at home. They were occasioned by the unclean condition of dairy implements, or the surroundings of the cheese-house. But he thought the most fruitful source of floating curds was the milk of unhealthy cows, and still this is a source that is seldom thought of by dairymen. He had found that the most profitable and safest way to deal with the milk from such cows was to throw it away. In the case of factories which make up milk brought from a considerable distance, he had no doubt that the great danger of bad curd and cheese is in the sour condition of the milk when it reaches the factory. He thought there is great need of milk coolers for factory patrons; yet he thought there is danger of cooling milk too suddenly and too low to make good cheese.

Mr. Countryman asked if any of the members knew of any implements for cooling milk. He was answered in the affirmative.

Mr. Shull then described two inventions for cooling milk, which

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were displayed at the State fair in Utica. One was a small vat filled with water, iced if necessary, the vat sitting in a larger vessel, thus leaving an open space around the sides and bottom of this cold water vat. The milk is poured in at one end and circulates through the open space, coming out at the bottom through a stop-cock. The vat holds about a half-barrel of water. The committee found by experiments that two pails of milk put into this vessel was cooled down from 98° to 72° in five minutes, with water from the well. The committee then put ice into the water, and cooled milk at 98° to 65° in five minutes. This he considered a very satisfactory implement, and was easily kept clean, with the exception of the faucets. These could be as easily cleaned, however, as the faucets of milk cans. The cost is about twenty dollars. If ice could not be had, the water would need to be passed through the vat constantly.

Mr. Lewis described another invention for the same purpose. This was a tin vessel made to fit inside the can and float on the surface of the milk. The milk also was strained slowly upon this floating vessel. The vessel or float is, of course, filled with ice-cold water. But he did not think the milk-cooler to meet perfectly the requirements of the dairymen, for such an implement had not yet been invented. The difficulty with all inventions at present is, that they present too many corners and creases where milk will collect and putrefy. This must be obviated in the perfectly successful cooler. Mr. Lewis then alluded to the want of cleanliness about factories as a general thing. He said that there were many factories in the country which could never make a pound of first-rate cheese until they are thoroughly purified and renovated. The drains are often carelessly constructed, and the whey allowed to collect and putrefy about the factory. In this way a terrible stench is produced, and the milk and cheese tainted. He believed that, as a rule, better cheese is made in the new factories of the country than in those that have been built for several years; because filth is allowed to collect from year to year about the old factories.

Several members spoke of the high price that certain factories and dairies bring.

Mr. H. D. Ellison, of Middleville, said he thought that the secret of these special high figures is, in the first instance, the feed of the cows of those dairies and factories. A richer and finer flavored quality of milk is produced in this way, and a better brand of cheese is the result. This soon gets a reputation with buyers and with consumers, and can always command an extreme price. It is well known

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that buyers come to Little Falls every Monday, with special orders for certain factories and dairies, and prepared to pay outside figures for them.

MANURES.

The second regular meeting of the club, for the month of November, was held at the court-house in Herkimer, Friday, the 25th. Although the question before the club was one of great importance to farmers, there was but a small attendance. Perhaps advice or exhortation on the subject is vain, but we cannot help thinking, and giving expression to our thoughts, that agriculturists cannot spend a half-day, once a fortnight, more profitably than by coming into the meeting of the club, and taking part in the discussions. Very few of them are so wise that they cannot learn something from others, or so ignorant as to be unable to give some valuable suggestions or information to their neighbors. If our agricultural friends would look at these meetings in this light, and attend them, they could be made interesting and beneficial to their members, and powerful aids in the advancement of agriculture.

But without preaching further, we will return to the report of the discussion.

Hon. Josiah Shull, of Ilion, opened the discussion, in the following paper:

In discussing the subject of fertilizers, I do not propose to advance any new theories, but will state practical experiments and their results. All who have had experience in farming will readily acknowledge the benefit of manures. All vegetable growth possesses manurial qualities, which, if properly returned to the soil, will produce beneficial results. We have but to study the condition of this growth to produce the best results. If left to ripen and dry up, the greater part of the nutritive qualities are evaporated and pass off in the air. If appropriated in its green state, when it contains the juices in their highest perfection, it becomes evident that this is the proper state to reduce it to a fertilizer. We infer from this reasoning that all vegetable growth that is to be used for the subsistence of stock, must be secured at the time when it shall have arrived at its highest perfection of growth; and that the natural elements must be retained, both to secure the greater benefit to stock and for manure. I am of the opinion that vegetable growth is rendered more valuable for manurial purposes by being consumed by stock. The mastication, pulverization and decomposition it undergoes, better fits it for assimilation with the plants.

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The value of manures is becoming better understood as we advance in good farming. When our lands were first cleared and cultivated, they contained the essential manurial elements for the production of good crops. By a series of cropping, the straw and grain elements were gradually extracted from the soil, and failure of crops followed. By experience we have learned that to succeed we must restore the elements extracted by the crop. All waste and fæcal matter possesses these essential elements.

The lands of central New York were once noted for their wheat-growing qualities. For the past thirty-five years the growing of this plant has dwindled down to almost nothing; caused mostly by failure of producing a paying crop, or a crop less remunerative than others, and partly by being infested by the weevil. As wheat growing declined, oats and barley have gradually given way in the same train. As a substitute, dairy farming has gradually been introduced, till it has nearly taken possession of the district. While the grain and straw were sold from the farm, the farm declined in its productiveness. The dairy, in consequence of its consuming the hay, straw and grain, and roots of the farm, which are returned to the soil in the manure has been the means of greatly improving the qualities of our lands.

The accumulations of the stable, containing the proper needful food for plants, should be well and properly cared for.

The time and manner of application have much to do with making it of the most value. If it shall be applied as a top dressing for grass lands, it should be done in the autumn of the year, when evaporation is less active than in the spring or summer, and be pulverized so as the particles shall be well and evenly distributed around the grass roots. It can be applied with equal effect, in the spring or summer if followed by rains and a moist atmosphere, till the grass shall shade the manure from the sun and protect it from the drying winds. Manure used in the spring, to avoid danger of evaporation, will be of the most value by being well incorporated in a mellow soil. The action of unrotted manure on plants is slower than that of rotted; the fermentation necessarily being gone through in the soil, the rotted taking the more immediate effect. Other fertilizers, such as ashes, lime and plaster, can be very beneficially employed as a dressing to land.

Commercial manures labeled as superphosphate, poudrette, etc., I have tried with very little success. My experience with them would not warrant me in paying freight and putting them on the land.

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A very valuable preparation or fertilizer can be made from the droppings of fowls, thoroughly composted with plaster. To each bushel of the droppings add one-half the quantity of plaster, place it in a pile, and whenever it becomes heated, shovel through, and in the course of ten days it will be fit for use.

The greater value will be obtained from this fertilizer, by using it with planted crops, mixing it with the soil. If used when planting the seeds, it should be well incorporated with the soil before dropping the seed. Or, if desirable, four or five times the quantity of dry muck can be mixed with it, then the mixing with the soil will not be necessary.

We have another and very valuable fertilizer that is almost totally lost to agriculture in this country— the liquid and solid wastes of the human body. When the value shall be better understood in connection with agriculture, ways and means will be devised to collect and utilize them.

Two years' experiment has satisfied me of the value of those wastes and the importance of converting them into a fertilizer..

For the purpose of securing those wastes, I have adopted an easy and cheap process, by the use of tubs in form and of the size of a common butter firkin, flaring at the top, and placed under the seat in the closet. These tubs have covers to be placed over them when the contents are to be removed, and handles on either side for carrying. Plaster is freely used while the wastes are accumulating, to take up the ammonia and render it inoffensive. Dry earth or muck is said to have the same effect as plaster in deodorizing it. The contents, whenever emptied, are immediately covered with plaster, and well worked through with a hoe, till they are completely absorbed by the plaster, when it can be shoveled into barrels ready for use. There is no more difficulty experienced in handling this preparation than the handling of superphosphates.

The preparation was used on corn and vines, and around cabbages, well incorporated with the soil, with decidedly satisfactory results. It was used in planting corn, in the same field by the side of the preparation from the hen droppings, producing results superior to that treated with the hen manure. One barrel of these wastes will absorb about two barrels of plaster. The value of the plaster is about one dollar a barrel; the preparation, I consider, worth five dollars per barrel. I think the day is not far distant, when these wastes will be more generally utilized as a fertilizer in the advancement of agriculture.

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GENERAL REMARKS.

An informal discussion of the subject succeeded the reading of Mr. Shull's paper. Mr. J. M. Childs, of Utica, led off, giving his experience in the manufacture of manures, and his opinion of the proper time and methods of application. When he was at home upon the farm, they felt the necessity of obtaining artificial manures. The amount made by the stock was not sufficient to keep the farm in as good condition as they wanted it. They found a large bed of muck and determined to make it useful in fertilizing the farm. The muck and everything contained in it was thoroughly rotted, so much so that they could cut through logs a foot thick, which were found in the bed, with a shovel blade. They drew out hundreds of loads of this decayed matter, and composted it with the stable and barn-yard manure. Their usual custom was to begin a large heap with a layer of muck, putting upon this a layer of green manure, about a third as thick as the muck, and so alternately the layers of muck and manure, until the heap was as large as desirable, or the manure was all composted. They would throw the waste corn stalks, or other coarse fodder, into the pile at intervals, and sprinkle them with unslacked lime, for the purpose of rotting them quickly. When they did this, they would cover the pile with dry earth, to retain the ammonia set free by the action of the lime. If they saw any steam coming from the pile, they would put on more dirt. In this way the decomposition of the coarse manure was hastened, without diminishing its strength, or as is commonly said, "burning it up." They covered the pile with but little labor by plowing the earth in the immediate vicinity of the heap, and scraping it upon it. They had often applied green muck to grass lands, working it down among the roots with a harrow, and obtained good results. They mixed hen manure with plaster and ashes before using it as a fertilizer. The proportion of the mixture was one bushel of ashes to four of plaster, and three of hen manure to forty of the mixture. It was then about the right strength for use. They generally used it on the corn, applying it in the hill. By thus carefully saving all the manure made on the farm, and obtaining what artificial manure they could, they were able to raise large crops, and, at the same time, steadily increase the fertility of the land. A neighbor, whose land was originally as good as theirs, pursued the opposite course, selling every bundle of straw and every product of the farm that he did not actually need for his stock or his family, and allowing the manure to waste. The difference between the two farms now is, that while the former will produce from seventy-

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five to one hundred bushels of oats to the acre, and other crops in proportion, and sold lately at niney-eight dollars per acre, the latter will produce from thirty to forty-five bushels of oats to the acre, and sold last year at seventy dollars per acre.

As to the time for applying the manure, Mr. Childs agreed with Mr. Shull that it should be put on in the fall. The ammonia is then carried to the earth by the rain and snow, and is there to assist vegetation in the spring and summer. If the manure is applied in the spring, unless there is much wet weather, the ammonia goes off in the air, and the value of the manure is lost. If the weather is very dry, the manure is a positive injury.

Mr. Shull showed a specimen of the compost described in his paper, obtained by mixing ordure with plaster. It was without odor, and looked very little different from unmixed plaster. It can be sown with a plaster sower, or applied to hill crops with the hand or spoon, like ashes or plaster.

Mr. Childs thought the patent earth-closet ought to be generally introduced. It is similar in design to the method adopted by Mr. Shull. It, however, has a handle attached to the closet seat, by lifting which a certain amount of earth or plaster is thrown upon the deposit. Dry earth, as dust from the road, is as perfect a deodorizer and absorbent of the ammonia of the urine as plaster.

Mr. Lewis said he made use of dry dust, scraped up from the highway, and had found it all that could be desired.

Mr. Shull thought plaster, at six dollars a ton, about as cheap as any material that can be used. And, moreover, it has a value of its own as a fertilizer. All agreed in the importance of saving the wastes of the human body, and all were of the opinion that it could be accomplished by the earth-closet, whether in its patent form, or in the rougher form as described by Mr. Shull. If the water-closet is used, the wastes can be utilized only by applying the sewage, in its liquid state, to the land. This is being done in England with most beneficial results. When applied in this way, the land is not only enriched by the solids of the manures which find their way into the sewage, but it receives all the benefits that come from irrigation. But the appliances necessary to utilize the sewage of villages or cities are much more costly, and therefore less practicable than the earth-closet. There is one other objection to the water-closet and sewage system, and that is the loss of ammonia from the wastes.

In regard to the manner of applying manure to particular crops,

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Mr. Shull and Mr. Childs were in favor of manuring corn in the hill, with some concentrated fertilizer.

Mr. Lewis had lost his seed in one or two cases, by using too concentrated manure in the hill. He is accustomed to put ashes and plaster mixed, on the hill, as soon as the corn comes up. and has found it to pay well. He draws out his stable manure as fast as it is made, during the winter, depositing it in small piles on the land where it is to be applied; and, in the spring, as soon as the frost is out of the piles, spreads them. If the ground is perfectly level it would be as well to spread the manure as it is drawn out; but if the ground has an inclination, and there is very little in this section that has not, much of the manure is carried to the low ground when the snow goes off in the spring. He condemned the custom so prevalent among farmers, of throwing the stable manure into piles under the eaves of the barn and leaving it there to soak. Fully one-third of it is wasted. Much of it is wasted, too, if allowed to lie in piles in the field for any great length of time during the fall or spring. A great deal, he said, could be done to increase the amount and richness of the stable manure, by properly feeding the stock. The richer the food the richer the manure. The English have this saying: "The more roots the more manure, and the more manure the more roots." It is a saying which should be acted upon by American farmers. He believed that our dependence must be on natural manures, and those manufactured on the farm with muck and waste matter; and not on artificial fertilizers, such as super-phosphates. The latter are more frequently worthless than valuable.

POTATO CULTURE.

The Herkimer county farmers met at the court-house at Herkimer, to consider the question of winter management of stock. The person appointed to open the discussion not being present the question was waived for the moment and Hon. Josiah Shull, of Ilion, was called upon to give the result of his experiments the past year in potato culture.

Mr. Shull commenced by saying that in the first place, for success in potato growing, it was important to have good soil, soil adapted to the crop and well prepared. Then the proper varieties for seed would be found to be a valuable consideration. Mr. Shull said he did not claim to have made any very extensive experiments. He had simply grown several varieties and adopted a certain order and system in their management, in order to satisfy himself as to which

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varieties were most profitable for him to cultivate, as well also to satisfy himself in regard to some other points upon which various and conflicting opinions prevailed.

The past season has been peculiar, and the weather has had a marked influence upon the potato, and quite different from any previously observed. The early hot weather seemed to check the growth of the plants and with some varieties it made them unfit for early use, while it injured their quality generally, so much so as to seriously damage the reputation of some kinds. This was especially so in regard to the Early Goodrich, which previous to this season has been held in high repute. This year the general complaint against this variety is that it is wet and soggy, often small and stunted in growth, and when attaining any size disfigured with knobs and prongs, so that many have become quite disgusted with the variety. Mr. Shull attributed the above appearance and condition of the Early Goodrich to the weather. The hot weather and drought in July, checked the growth of the tubers, the vines and leaves became shriveled under the influence of the hot sun, and this continuing for a considerable length of time, would, of necessity, have an important influence in producing the result which we find this year. The potato is a plant that requires to be pushed forward rapidly to its maturity, and especially should its early growth be unobstructed.

Mr. Shull described the land on which his potatoes were planted, a gravelly or sandy loam and in fine condition. On one piece of two acres a part was planted with Early Goodrich, about the 17th of April and the rest six days later. The earliest planted matured finely about the 25th of July, and made a good yield. The others, only six days later, were caught at a critical point of their growth by the hot weather, and the yield was poor and the tubers full of knobs, and only about half the size of those on the early planted ground. The soil where both lots were grown was the same, and both were treated in every respect alike except in the time of planting. About twenty loads of well-rotted barn-yard manure were applied per acre to the land before planting. The other fertilizers used were plaster to absorb moisture at the time the potatoes are cut for seed. Then, just as the plants are breaking ground, a tablespoonful of the following mixture applied directly upon the hill, viz.: Ashes, two parts, and one part lime, with one part plaster, all thoroughly mixed together. The seed potatos are cut in pieces so as to have but one eye to the piece, two pieces put six inches apart in a hill, and the hills made three feet by three feet each way.

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Mr. Shull thinks shallow planting the best. The rows are marked off with a common corn-makers, and the seed covered about two inches deep. The cultivation consisted in running the cultivator through the rows from time to time, and using the hoe to keep down weeds, and adopting, so far as possible, the flat culture instead of hilling up the earth about the vines as is commonly practiced. The late varieties were treated in the same way as the early sorts as above detailed.

The early varieties consisted of Early Goodrich, Early Rose and Junes. The Junes were of good quality, but less productive than the others. Mr. Shull was very careful to note all the expenses of the crop, and finds potato growing more expensive than he anticipated before keeping a strict account of expenditures. He found manuring, plowing, and preparing the soil, together with cost of seed, planting, hoeing, digging, and marketing the Early Goodrich variety, to be eighty dollars per acre. The cost of digging and marketing in July was twenty cents per bushel. The average yield of those planted first was at the rate of 112 bushels per acre. Those planted six days later did not yield near so well. The Early Rose produced at the rate of 132 pounds for every one pound of seed. The late varieties, grown by Mr. Shull, were the Harisons, Gleasons, Calicos, Colbrooks, and Chilis. Of the Harisons, where large potatoes were used for seed and cut, and planted as previously indicated, the yield was at the rate of 325 bushels to the acre. Small seed potatoes of the above variety, similarly treated in cutting and planting, gave a yield of only 288 bushels per acre, making a difference, in favor of using full-sized seed for planting, of thirty-seven bushels per acre in the yield.

The Gleasons, good-sized seed, treated like the Harisons, yielded 263 bushels per acre. Small seed 215 bushels per acre. Difference in favor of large seed forty-eight bushels per acre.

For the other varieties large seed was used, and the comparative yield of the different varieties was as follows:

	Bushels per acre.
Harisons	325
Gleasons	263
Calicos	245
Colbrooks	180
Chilis	150

The whole expenses for planting, seed, hoeing, digging, and marketing, including seed, at its selling price, viz.: Harisons, ten dollars per barrel; Gleasons, six dollars per barrel; Calicos, six dollars per barrel; and Chilis, four dollars per barrel, amounted to $60.50 per acre.

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As potato culture is becoming of considerable importance in this part of the State, Mr. Shull's statistics are of value, since the soil, the culture, and everything connected with the treatment of the crop for the several late varieties were precisely alike. Mr. Shull remarked that his ground was very well adapted to the potato; was in good heart, being sod well turned under, well prepared for the crop, and the after culture sufficient to keep the plants free of weeds.

In gathering the crop, boxes, holding one bushel each, are used, in order to avoid handling the potatoes twice. These boxes are made of common lathing, in the following manner: The lath are cut sixteen inches long, which gives three pieces to each lath, and thirty-six pieces or twelve lath will make a box. The pieces are nailed to four corner posts one and one-eighth inches square, and twelve and seven-eighths inches high. Commence by taking two posts and nailing the pieces of lath to them, leaving spaces between the lath until that side of the box is made, and in the same way for the other side. Then set these up so that the pieces of lath will come inside the box, and nail on the pieces for the other two sides, so that the latter come on the outside of the box. In this way, it will be seen the posts on the two sides project on the outside of the box. A strip of board is nailed across the projecting posts on each side for handles. The nails used for putting on the handles should be long enough to go through the posts and clinch. Then put the pieces across the bottom and nail to the lath, and add a couple of pieces from post to post across the ends of the lath at the bottom, and the box is complete. A box of this kind costs but a mere trifle. From twenty-five to thirty are needed. The boxes are distributed along the rows and filled, when they are lifted into the wagon. About sixteen boxes will fit into the wagon; then, by placing another set on top of these, from twenty-five to thirty bushels of potatoes may be hauled to the cellar. The boxes are then taken off and dumped, and are ready to be used for another load. Mr. Shull says he finds this arrangement to materially cheapen the cost of housing potatoes, since it avoids handling over twice; besides there is less liability of bruising, or marring, potatoes, which he considers of some importance as regards their better keeping, etc.

MIXED HUSBANDRY UPON DAIRY FARMS.

Several weeks since we gave an estimate made by some of the best farmers in Herkimer county, in regard to the cost of producing a pound of cheese. The article attracted considerable attention from dairy farmers, and so far as we have learned, has been considered as

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approximating very nearly to the true figures in the matter. So long as a considerable profit was made upon the dairy, the farmers of Herkimer county would not entertain the thought of entering upon the system of mixed husbandry in their farming. The idea that dairying, and nothing but dairying was most profitable seems to have taken such strong possession of the mind among Herkimer county farmers, that the great majority could not be induced to change their system by the most potent argument. It needed something stronger than mere words to induce these men to think for a moment of mixed husbandry. That argument has now come in the low price for dairy products, and the startling fact, that high priced land, high priced cows and high priced labor, sweep away all the profits of dairying when cheese sells for fourteen cents, and, therefore, that some other shift must be made to piece up the receipts so that the ends may be made to meet. Only a few days since, in conversation with an intelligent Herkimer county dairyman, who had made a good many thousand dollars at dairying in former years, he expressed the opinion that in the whole course of his experience the business never looked so gloomy as at the present time.

It is an admitted fact that Herkimer county farms did not pay a profit last year in making cheese at fourteen cents; and the question now presents itself as to what course is to be taken the coming year to turn the tables. It is evident that the price of land, the price of cows and the price of labor must be reduced to meet the exigencies, together with the adoption of a system of mixed husbandry.

At a recent meeting of the Herkimer county farmers at the court-house, Herkimer village, this question of mixed husbandry was up for discussion. Hon. Josiah Shull, of Mohawk, opened the discussion, reading an elaborate paper in its favor, as more remunerative than the usual system practiced in the county.

In the discussion which followed Mr. Shull's paper, J. D. Spinner, of Herkimer, did not agree with the generally received opinion that dairy farming as commonly practiced in Herkimer county, had greatly improved the land within the last few years. He stated that the system practiced by the farmers when he was a boy, that is, summer fallowing, frequent plowing and raising wheat, left the land in much better condition and with more profit to the farmer than the present system, and in the course of his remarks he introduced the subject of producing and applying manures to the land, giving his experience, etc. Several others spoke upon this question, but as the notes

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handed to us of the proceedings are exceedingly brief, we can only give the remarks of Mr. Shull. He said:

The dairy has become of such absorbing interest to the farmers of this country, that we have almost come to the conclusion that our soils are only fit for the growth of grasses for the use of milch cows. When the lands of the country were new, cropping with grain was followed a long term of years without much attention being given to the exhaustion of the soil. In fact the soils were supposed to be inexhaustible. Manure was allowed to accumulate in large quantities and to waste, and when taken from the yard, it was more to get it out of the way than to improve the soil. After a long succession of cropping, crops began to lag, and the attention of the farmer began to be called to producing what he supposed was more congenial to the soil, and finally dairy farming was adopted.

As the dairy took the place of grain-raising, the lands began to improve, and it became conclusive, as they supposed, that dairying, exclusive of grain, was the right business; when, in fact, the dairy enriched the lands by returning to the soil the necessary constituents, making them more productive, being equally productive for grain as for grass. The area of land became, and is now being so fully stocked, that the majority of farmers have not become fully aware that they can make it profitable to raise grain in connexion with dairying. So persistent has the farmer become in his dairy efforts, that instead of producing his own corn and other grain for feed of stock, and his flour for the use of his family, he has purchased from the feed and flour dealers, while the greater part of the time he could have produced those articles of food from his own farm, and in most instances an article superior to that he was obliged to purchase. It has been fully demonstrated, within the past few years, that wheat can be raised, with success, equal to former times, allowing the same care in preparation of the soil.

If the farmer should adopt a system of cropping his lands, in connexion with the dairy, keeping an amount of stock that could be well kept in condition, and alternate his lands, his profits would be larger than when kept exclusively to the dairy.

We will draw a comparison of the system of mixing farming with that of the exclusive system, and give statistical comparisons which will more fully illustrate. We will form our basis on the cost of keeping one cow, and what she will produce, which, multiplied by the number, will give what will be required for a dairy of any number of cows and any number of acres. The quantity of land required to

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sustain a cow for one year in pasturage and hay is about three acres, in the ordinary state of cultivation. At an average rent of ten dollars, per acre, we have thirty dollars. Estimating the average quantity of cheese to a cow at four hundred pounds, at fourteen and a half cents per pound, will amount to fifty-eight dollars for the use of three acres of land. Deduct the expense of keeping, and we have a balance of twenty-eight dollars, or nine dollars thirty-three cents profit the acre. In a further estimate of the receipt and expense account of the cow we charge ten dollars for making the hay and tending, and render for milk, butter and manure, ten dollars, as offset, one against the other. We will compare the dairy with the different kinds of grain and products that enter the largest into the consumption. 1st. We will consider the expense of preparing an acre of ground for wheat:

Plowing and dragging	$6 00
Seed, two bushels, at $2.50	5 00
Harvesting and threshing	7 25
Rent of land	10 00
Total	$28 25

We will call the average product seventeen bushels, per acre, at $2.50, per bushel, equals $42.50; straw, $4.00. Total, $46.50. Leaving a balance of $18.25 profit to the acre.

2d. We will consider the production, expense and receipts of an acre of corn:

Plowing	$4 00
Preparing	3 00
Seed	1 00
Labor, planting	2 00
Hoeing, etc	6 00
Fertilizer and applying the same	1 00
Harvesting	8 00
Shelling	2 00
Rent of land	10 00
Total	$37 00

We will call the average product thirty-five bushels per acre,

at $1.30 per bushel	$45 50
Stalks	10 00
Total	$55 50

Leaving a balance of $18.50 profit the acre.

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3d. We will consider the production, expense and receipts of an acre of oats.

Plowing	$4 00
Seed and sowing	2 00
Dragging	2 00
Harvesting and threshing	4 00
Rent of lot	10 00
Total	$22 00

Call the average product forty-five bushels per acre, at seventy cents per bushel $31 50
Straw 6 00

Total $37 50

Leaving a balance of $15.50 profit the acre.

4th. We will consider the production, expense and receipts of an acre of potatoes.

Plowing	$4 00
Preparing	2 00
Seed	7 00
Planting	3 00
Tending	5 00
Fertilizer	1 00
Harvesting	10 00
Delivery	4 00
Rent of land	10 00
Total	$46 00

Call average product 130 bushels per acre, at fifty cents per bushel, sixty-five dollars, leaving a balance, after deducting cost, nineteen dollars profit to the acre.

The summary of the above results is as follows:

Profits on an acre to the use of dairy	$9 33
" " " wheat	18 25
" " " corn	18 50
" " " oats	15 50
" " " potatoes	19 00

These results are based on the supposition that the lands are of a good quality, and capable of producing grass on the supposed basis that three acres will support a cow for one year. We, in this account, do not take in consideration extreme cases, such as lands in a very high state of cultivation, nor the poorer and less productive sections of the

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country, where a much larger breadth is required to support a cow or to produce a bushel of grain. The prices of the different productions here enumerated vary from time to time, which, of course, changes the results.

In pursuing this mixed system of farming, a rotation in cropping, and of pasture and meadow, should be observed, for the reason that a continuous succession of cropping requires to be followed up with a good supply of manure. Not one-tenth of the manure can be produced from the farm to supply the necessary demand to produce a succession of good crops. The dairy returns to those portions of grass lands in pasture the necessary manure, which, in connexion with other fertilizers, makes the soil rich and good for cropping. The rotation of cropping most commonly recommended is, after plowing green sward, first a crop of corn, then of oats, and followed by that of wheat; in all cases, when wheat is sown, it should have a good coat of manure well worked in the soil, and the land seeded with clover and timothy, with any other mixture of grass seed desired. From the above deductions, we arrive at the conclusion that a system of mixed farming can be pursued with beneficial results.

AGRICULTURAL FAIRS.

A communication was read from the secretary of the Trenton Union Agricultural Society, on "How to conduct agricultural fairs to produce the best results to the community."

Mr. Whitman believed the proper design of an agricultural fair is the benefit of the farmer. The mechanic, as far as he assists the farmer, should also be regarded in these fairs. Very few of these gatherings or exhibitions are conducted with this end in view. It is difficult to make a fair so conducted acceptable to all classes and persons. It is too simple and staid. It is not exciting enough. There are many who think that a fair without a horse-trot is worthless. And he knew that such an addition to the legitimate purposes and exhibitions of fairs, draws large crowds. But the danger in introducing races, is that they soon come to supplant everything else. There is no strong inducement, when such a result is brought about, for the farmer to compete for superiority in farm products. They all like to see good horses, and good trotting, but they do not like to see this made the all engrossing object of the fair. He thought premiums ought to be given for the best exhibition in the production of given crops. Such premiums would be of practical value to the agricultural community. In regard to the method of exhibiting and passing judg-

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ment on machines and implements, commonly pursued at our fairs, he believed it did more harm than good. Farmers cannot accept decisions obtained in this way as reliable. They have too often been made the victims of humbugs, which have received the sanction of humbugging judges at agricultural fairs. A far better way for deciding upon the merits of implements, is to allow each and every person, who desires, to thoroughly investigate, to handle and make trial of all of them. Mr. Whitman concluded by reading the remarks made by himself before the executive committee of the Herkimer County Agricultural Society.

Mr. Barnum did not agree with the preceding gentleman. He was in favor of connecting horse-trots with regular agricultural exhibitions. Not because he though there was a necessity for making the fairs more attractive. He did not know that he would wish to give premiums for speed. He believed there are many honorable men, men of high social and moral standing, who owned and took an interest in fast horses. We need fast traveling horses as well as draught horses. Moreover, horse races at fairs add greatly to the receipts, and need not necessarily tend to demoralize them. He thought farmers too liberal in their application of the term "humbug" to farm implements.

Mr. Sherman thought the humbug was oftentimes as much in the farmer as in the machine or implement. The farmer frequently gets hold of a machine that he does not know how to use, and because of this ignorance the machine fails, and is pronounced worthless and a humbug. He gave several instances illustrating this opinion.

Mr. Shull said in the discussion of this subject we first would be led to inquire the object of agricultural fairs, and secondly, in what manner or how they should be conducted to accomplish their object. The object of agricultural fairs should be to bring out farm products, dairy products, stock of the various kinds, implements of utility, and anything intended to improve the condition of mankind. In this progressive age of experiments, inventions and improvements, to stand still is retrogressive.

In order to carry out the intentions of our fairs, they should be so conducted as to bring out facts and processes to show in what manner the improvement or the article was produced. The fact of showing a good article will not particularly result in benefit unless it be accompanied with a statement of the process, manner and expense of producing the article of whatever its name or nature. In viewing any product or article, the natural

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inquiry arises "Will it pay?" The eye likes to be pleased, and the purse wants pay; so to accomplish both objects, the showing a fine article should be accompanied with an account of all the labor and expense that it may be judged fully. If it will pay the producer, the public will enter into its production.

To bring out all statements and facts, liberality should be shown in the offer of premiums. The object of the award should not be so much to benefit the recipient as to obtain general results. Quite an amount of expense necessarily would be incurred in the preparation of the statement. The premium, therefore, at least should be enough to hold out an inducement for the trouble and expense.

As dairying is one of the leading interests of the farmers a liberal premium should be offered for the five dairy cows that shall have given the largest quantity of milk from May 1st to September 1st, previous to holding the fair, accompanied by a statement of the quantity each cow gave in each month; estimating the quantity by obtaining the weight of milk each cow gave on one day of each week during the time. Also require a statement of the food given, and the treatment; the treatment not necessarily to be alike.

Products and animals that rank highest in importance, should receive the most liberal encouragement.

The horse should be adjudged for endurance, style, symmetry and activity. Farm and carriage labor is the principal employment the horse is put to, and a class of horses should be reared best adapted for these purposes. The horse is not for the race course, but for carriage and farm labor. The practice adopted at many of the fairs of racing or matching horses in the race is cruel, demoralizing and corrrupting, and should be discountenanced by all good order-loving citizens. If a horse is to be shown or exhibited on account of speed, let him be shown singly and timed. The endurance and activity can be judged of without the race and the excitement of the mob. The race is always conducted with excitement; therefore, to avoid the excitement consequent on a race, the premium should be offered only for exhibition, not for the race.

Mr. X. A. Willard thought there was not care enough taken in the selection of judges for fairs. Committees are appointed, the members of which refuse to serve, and committees are often made up on the ground at the last moment, that are incompetent. He had known of committees, both at State and smaller fairs, who were under the influence of inventors of machines, or owners of stock or other property on exhibi-

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tion. Many premiums are, therefore, awarded that are by no means fair, or of any value.

Mr. Lewis thought that it was impossible to select judges who would not be more or less influenced by prejudices. If a man had known a particular cheese-vat, and had found it a good one, he would be very apt to give preference to such vat. He was once on a committee for awarding premiums for butter, with a man who was strongly prejudiced against Onondaga salt, and who believed it was unfit to salt butter with. This gentleman insisted on each specimen being accompanied with a statement of the kind of salt with which it was salted. When this statement was handed in, Mr. Lewis pocketed it and the other gentleman was, therefore, ignorant of what specimens were salted with Onondaga salt, and what were not. The result was, that the committee agreed in giving the premiums, in every instance, to the butter salted with the Onondaga salt. This would not have been the result had the other gentleman seen the statement before passing judgement. He had held aloof from fears oftentimes, because of the men who control, and the abuses connected with them. He was aware he had made a mistake in this. The remedy for all these abuses is in the hands of the people. If they do not apply the remedy, theirs alone is the fault. He had no objection to an exhibition of speed at fairs. But the jockeying and the gambling that come from matched races should never be allowed. This turns the fairs into a horse trot or race, and ought to be so called. He had often attended fairs where the exhibition of fruits, grains, and neat stock was not as extensive or creditable as he could afford from his farm. He believed our agricultural fairs will be valuable just in proportion to their interest being diffused among all branches of agriculture, and their value will be lessened just in proportion to their interests being concentrated on a single branch or object.

At the close of the regular discussion, Mr. Willard spoke of the large number of Canada cows that have been imported into this locality this spring. He thought farmers might expect the foot disease to follow this importation. The disease is raging in Canada, of a very virulent nature. It is much worse than the foul in the foot that has been prevalent in this section. He had never found any difficulty in dealing successfully with that disease, if it were taken in time. He was accustomed to wash out the claws of the cow's foot and put in corrosive sublimate. Mr. Lewis had found common salt a remedy; also, salt and kerosene. He believed, however, that the disease is one of the blood, and he therefore feeds his cows sulphur constantly

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with the salt. He now feeds one-half teaspoonful of sulphur to four quarts of salt. He would soon reduce this amount of sulphur. This disease is found to precede and accompany abortion very generally. At the time the first abortions occurred in his herd, the past winter, he discovered about thirty cases of foul in the foot among his cows. But one or two of them were lame.

Coloring Butter and Cheese.

After the transaction of some miscellaneous business, the question of "Fertilizers, their application," was chosen for discussion at the next meeting. Mr. Shull was appointed to open the discussion, assisted by J. M. Childs, of Utica.

The following resolution, presented by Hon. Josiah Shull, was unanimously adopted:

Resolved, That the thanks of the club are hereby tendered Professor Caldwell, of Cornell University, for his analysis of the samples of annatto furnished him by the club, and for his report thereon.

The regular discussion was then taken up, and opened by Hon. Harris Lewis, in the following paper:

"Is Butter and Cheese Improved by Coloring?"

If that rich golden color we all so much admire in these dairy products is imparted by nature, I must answer the question in the affirmative. But if butter or cheese is colored by art, I answer in the negative.

At the same time, I admit that the eye, to a certain extent, controls the palate. For instance, fruit full of worms, or cheese alive with skippers, is sometimes eaten with a good relish in the dark, or where there is not sufficient light to reveal them; whereas, in the light, the eye would render the worms and skippers alike repulsive, and both would be rejected by the palate as undesirable food.

As a rule, whatever kind of food is repulsive to the sight will be at once rejected by the palate. But, on the other hand, many kinds of food may be fixed up, glossed over, and colored, so as to be very pleasing to the eye, and, at the same time, not at all acceptable to the palate. Not all the golden butter and yellow cheese will be found of first quality, merely because they have a good color, for the greater the amount of filth worked into their composition, the greater the necessity for some favorite color to cover it up; and, as charity will cover a multitude of sins, so annatto is sometimes used to cover a large amount of filth. Again, annatto is almost always used in skim-milk cheese, of the sky-blue quality, in order to render it rich, creamy,

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and more edible than leather or tough white oak. The addition of any substance to milk, foreign to its composition, either before, after, or during its change to butter or cheese, will injure the flavor and keeping qualities of both butter and cheese. If pure annatto, or even tumeric, with which almost every basket of annatto is largely adulterated, were the only agents used for coloring butter and cheese, this subject would not be of sufficient importance to claim the attention of this club, or of those who consume these dairy products. But when we take into consideration the fact that, of over forty different specimens of annatto which have been analyzed in this country and in Europe, by able and reliable chemists, not one specimen was found pure, but almost all were found to contain red lead, vermilion, or arsenic, in greater or less quantities, or some other poison, the subject becomes of the greatest importance to those who use this kind of coloring matter in cheese or butter as an article of food.

The small amount of poison contained in a pound of cheese colored with this vile annatto may account for the indifference of the producers and the unconcern of the consumers. But all poisons taken habitually with the food in small quantities become cumulative poisons, and are by far the most certain in their effects and fatal in their results, like other dangers that approach us unseen.

During the fourth annual meeting of the American Dairymen's Association, held at Utica in January, 1869, it was my misfortune to offer for the consideration of the dairymen there assembled the following resolution:

Resolved, That coloring cheese with annatto is an injury to the cheese and a cheat to the consumer.

My only object in bringing the subject before that large and intelligent body of cheese makers was to relieve them of an unnecessary and often perplexing operation in cheese making, and to render cheese what it might, and always should be, one of the most healthful and nutritious articles of food. However unaccountable it may appear to the members of this club, it is nevertheless true that the effect of this resolution upon the cheese makers there assembled was not unlike Paul preaching at Ephesus, for all cried with one voice: "Great is annatto for coloring cheese; for all Englishmen and all the rest of the cheese-eating world worship annatto." One gentleman from this county arose, much excited, portrayed in glowing terms the exceeding beauty of annatto, told the convention he rather liked the taste of it, eat a pound of the vile stuff with great gusto, and sat down more exhausted with his effort than satisfied with his logic. Other

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gentlemen followed on the same side, and as no town clerk appeared to appease the people or dismiss the assembly, the resolution was dismissed in a summary manner by an almost unanimous vote of the cheese-makers.

It is a fact as lamentable as it is true that a large class of the consumers of butter and cheese will pay a price for annatto far above its cost, and so long as this shall continue the craft of the annatto men will not be in danger; but by it they will continue to get their wealth. About a year ago, at the suggestion of the club, Mr. Waite, then a member, and a reporter of its discussions for the Utica Herald, undertook to obtain specimens of annatto of cheese-makers who delivered cheese at Little Falls, and so located that the specimens of annatto would in all probability be obtained of different dealers. Six samples of annatto were obtained, all from cheese factories, and purchased of different dealers. Each sample was numbered by Mr. Whitman, in his capacity as corresponding secretary of the club, a record made and kept, and the samples of annatto sent to Prof. G. C. Caldwell, of Cornell University, for his analysis. After Prof. Caldwell had completed his analysis of the six specimens of annatto sent him, which he knew only by their numbers, he returned the result of his examination to Mr. Whitman, as follows:

CORNELL UNIVERSITY, ITHACA, *June* 23, 1870.

Mr. S. S. WHITMAN,

Corresponding Secretary Little Falls Farmers' Club:

DEAR SIR.—I have examined the samples of annatto sent by you with the following results:

No. 1, liquid extract. [This is the famous Nicholas' extract, considered the purest, as it is the costliest, in use. It was obtained from A. Smith & Co.'s factory, St. Johnsville, and bought of Jerry Snell.] The residue left after expelling the water by evaporation was burned. The ash thus obtained was quite white, and consisted very largely, if not almost entirely, of carbonate of potassium, which was undoubtedly used in preparing the extract. The residue as well as the ash is free from poisonous metals.

The residue contained:

Organic (coloring) matter	43	per cent
Inorganic matter (ash)	57	"
	100	

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No. 2. [From Brockett's Bridge factory, and bought of P. H. Smith & Co.] This sample left a reddish ash when burned, and it was found to contain a very little copper.

Composition, in 100 parts:

Water	15.15
Organic (coloring) matter	69.90
Inorganic matter (ash)	15.00
	100.00

No. 3. [Dairy Hill factory, Norway, and bought of A. S. White.] This sample left a reddish ash when burned, and also contained a very little copper.

Composition:

Water	15.90
Organic (coloring) matter	71.66
Inorganic matter (ash)	12.44
	100.00

No. 4. [From Avery & Ives' factory, and bought of B. & W. Brand.] Left a red ash when burned, and contained more copper than the samples two and three.

Composition:

Water	14.05
Organic (coloring) matter	66.90
Inorganic matter (ash)	18.60
	100.00

No. 5. [From the Nichols' factory, Fairfield, and bought of L. E. Ransom, No. 47 Maiden Lane, New York.] Left a red ash when burned. The sample contained a notable quantity of copper, and, also, it appeared to contain traces of arsenic.

Composition:

Water	15.60
Organic (coloring) matter	71.74
Inorganic matter (ash)	12.66
	100.00

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No. 6. [From Zimerman Creek factory.] Left a reddish ash when burned. The sample appeared to contain no poisonous metals.

Composition:

Water	15.3
Organic (coloring) matter	69.3
Inorganic matter (ash)	15.4
	100.00

The larger the proportion of organic matter, the larger, it may be presumed, is the proportion of the coloring matter. This does not, however, necessarily follow, for the annatto may have been adulterated with starch, or some other organic substance that, like the coloring matter, would be expelled by heat.

Voelcker examined some English annattos in 1863, and found a much smaller proportion of organic matter than the sample examined by me contained. In one, for example, which bears a good reputation, there was but about twenty-seven per cent of organic matter; and another, which he also calls a superior sample, contained but thirty-eight per cent. Hence it would appear that the annatto used in this country, at least just at present, is much superior to what was used in England then.

Voelcker says nothing about the occurrence of copper in annatto; but Anderson, the well-known Scotch agricultural chemist, does allude to it, in an article in the transactions of the Highland and agricultural society, containing the results of his examination of some samples of the substance. He does not think it is an adulteration, but rather that the annatto becomes contaminated with the metal in the course of its manufacture. In one stage of the process the coloring matter is boiled in copper kettles.

The fact that there is a cheap pigment containing arsenic, which has the color of annatto, and therefore might be used to cover up adulteration with light colored substances, led me to search for it in every sample; but I found indications of it in only one, No. 5, and though the indication was a tolerably certain one, I should like to examine another and a larger sample of the same article before announcing the presence of so poisonous a substance in it with unequivocal certainty.

I should like also another and a larger sample of No. 4, for the purpose of determining the proportion of copper in it.

It is noteworthy that a specially diligent search for lead did not

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reveal its presence in any of the samples. This poisonous metal is spoken of by both Anderson and Voelcker as a frequent adulteration of annatto in the form of red lead.

Yours truly,
G. C. CALDWELL.

GENERAL REMARKS.

At the close of the paper and report, the discussion became general. Although none of the members present were prepared to say that the use of annatto, even when perfectly pure, improved the quality of either butter or cheese. Mr. X. A. Willard took the ground that the dairyman had not only a right, but it was for his interest to color those products when the market demands it. He, of course, believed that only pure annatto should be used; and if the dairyman made use of coloring matter which he knew to be adulterated he was doing wrong. He is of the opinion that a pure article can now be obtained; the annattoine. No analysis of this has yet been made, though we understand that a sample has been sent Prof. Caldwell for analysis, and his report will probably soon be made public. It was suggested by Mr. Lewis that although the annattoine might now be pure, the chances are that it will in time be adulterated. In order, therefore, for the dairyman to color his butter and cheese with annatto, and be sure that he is putting into those articles of food no poisonous or deleterious substances, he must consult a chemist in regard to every sample he uses. Mr. Willard thought it was for the interest of the manufacturer of annattoine to insure its purity, and he did not doubt it would be done. He considered the assertion made by Mr. Lewis that as milk is in itself a perfect article of food, the introduction of any foreign substance, however harmless in itself, positively injures the butter or cheese made from it, a rather sweeping statement. He said the noted butter-maker of Chester county, Pennsylvania, who sells his butter in Philadelphia for one dollar a pound, uses annatto in every pound that he makes during the summer as well as winter. His customers prefer the butter so colored to the paler colored article made from pure milk. They know that the rich, beautiful color so pleasant to the eye, and for which they are willing to pay an extra price, is artificial, so that no deception is practiced by the seller. Mr. Willard was sure that many preferred cheese of deep orange color to the pale article. Such a color serves to whet the appetite. In order to get this shade, annatto must be prepared for use, or as the common

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phrase is, "cut" with alkali. It cannot be prepared with any other solvent and produce the rich shade demanded by the London market. Prof. Voelcker says that his analysis of the Nichols extract shows this to be nothing but annatto, purer than is usually found in the paste form, "cut" with alkali. Mr. Willard admitted that the process of coloring cheese evenly and properly is difficult; but the skill and perplexity required for the work is more than paid in the increased price of the product.

The other members took very little part in the discussion, and it continued but a short time.

MANLIUS AND POMPEY.

The Manlius and Pompey Agricultural and Mechanical Association report for the year ending January 17th, 1871, as follows:

That the balance in treasury January 18th, 1870, was	$422 92
The receipts for members' tickets.....	287 00
For entrance to the fair, etc.....	430 89
	$1,140 81

EXPENDITURES.

Rent of fair grounds.....	$125 00
Printing	62 75
Police at time of fair.....	56 00
Building for treasurer's office	14 58
Labor preparatory to fair and clearing away building blown down.....	15 65
Stationery for use at the fair.....	5 74
Secretary	40 00
Treasurer's clerks	8 00
Forage	8 40
Paid out for premiums.....	310 25
On hand.....	494 44
	$1,140 81

Considerably more than this balance will be needed to replace floral hall, which was blown down last November. The twelfth annual fair of the association was held at Manlius village on the 5th and 6th of October, 1870. Owing to the unusual warmth of the previous summer, the time of holding the fair proved to be too late for a full exhibition of grapes. The weather was quite unfavorable also, and yet the

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exhibition was a good one, and the receipts were a few dollars greater than the expenditures and liabilities incurred during the year.

WILLIAM MANLIUS SMITH,
Secretary.

MORAVIA.

The thirteenth annual fair of the Moravia Agricultural Society was a success. The morning of the first day broke cloudless, and at an early hour people from adjoining towns began to make their appearance with stock and articles for exhibition; and before the hour of ten had arrived the display was much larger than that of any previous year.

The display of stock was first-class, and it was claimed by parties who were present at both that it was superior to that of the county exhibition. Mr. Jackson, of Ledyard, exhibited his entire herd of blooded cattle, some twenty-five in number, the mammoth bull being the great attraction for stock raisers on that part of the grounds; while at another point a large crowd were gathered about, discussing the fine points of the full blooded Alderney calf, five months of age, owned and exhibited by Mr. J. H. Grant, of Locke, for which he refused an offer of $100. Mr. E. E. Brown, of Niles, had on exhibition some very fine blooded cattle and sheep. Mr. B. Chase, of Venice, exhibited a Cotswold buck, which weighed 287 pounds. There were a large number of pens of sheep and swine, also a number of cattle and horses, worthy of a more extended notice than simply the award of a premium.

Bench Brothers & Hodgeboom, of Auburn, had on the grounds one of the finest top buggys ever manufactured in this county, and which was awarded the first premium. W. G. Wolsey showed an open buggy that would be a credit to any establishment. Parker & Boardman, with their platform spring and lumber wagon, showed that Moravia mechanics could do as good work and in as good taste as any others.

The Brinkerhoff washing machine and potato digger were shown up to the satisfaction of all.

Grain drills, hay tedders, emery wheels and mowing machines were well represented.

In floral hall articles of value and for ornament were tastefully displayed, and showed to good advantage in the limited space allowed, the hall not being completed so as to be occupied on the second floor. At the east door the first display on the right was from

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the firm of William Hayden & Co., of Auburn, under the supervision of Mr. R. T. Morgan, who shows much skill in the display of their celebrated "no shoddy" cloths, flannels, and yarns. Mr. B. Allee, of this village, who is agent for their goods, was busily engaged in running one of the Singer sewing-machines which had a first premium. Directly across was a display of stoves from the establishment of Hale & Greenfield, of this place, comprising several of the most popular cook and parlor stoves made.

This exhibition was flanked by some very beautiful specimens of work from the Moravia marble works, Haywood & White, proprietors, and which showed that Moravia had received from Oswego an establishment in which they may justly feel a pride.

Perry & Waterman had two pianos and a cabinet organ, which attracted much attention for their beauty of finish; but the attraction was much greater when the fine tones were tested and shown by the highly accomplished and talented performer, Miss Sarah Petty, of Port Byron. The invincible Snyder, the gentlemanly agent of the firm, was on hand to give information to the inquiring throng. Further along was the stand of Fred Small & Co., dealers in stoves, of this village, and they were not behind the times with their variety, and took a portion of the blue cards. In close promixity were the stoves from the firm of Ten Eyck & Choate, Auburn, who had one of Peckam's Popular cook stoves, which received the first premium; the Empire gas burner parlor stove and Cosy Light, and the Vindicator cook, besides several others of less notoriety; making, altogether, one of the greatest displays of stoves ever made in this place.

The display of paintings, engravings, etc., was very good. Mr. T. T. Tuthill, of this village, exhibited eighteen frames of picture photographs, which, although there was no competition, failed of receiving the attention of the viewing committee.

Taken as a whole, as we have before said, the fair of 1870 was a success; and in point of entries, and numbers in attendance, is ahead of any previous one:

Total receipts	$2,238 89

DISBURSEMENTS.

Building	$1,106 65
Premiums and expenses	866 90
Cash on hand	265 34
	$2,238 89

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Officers elected for the ensuing year are: Elondo Greenfield, President; M. E. Kenyon, Secretary; and M. K. Alley, Treasurer.

M. E. KENYON,
Secretary.

ONONDAGA.

The Farmers' and Mechanics' Club of Onondaga herewith submits its third annual report:

The whole amount of money received by the club during the year 1870, from all sources, including a balance of $5.11 on hand at the last annual report, was $215.98; and the disbursements, for the same period, were $87.56, and for the following objects, viz.: On account of room rent, $33; for expenses at the annual fair, $18.43; for printing, paper, and postage, $29.13; and for miscellaneous purposes, $7, amounting to $87.56, leaving a balance on hand this day of $128.42.

The club has had frequent meetings for discussing subjects pertaining to agriculture and the interests of the club during the year. On the 18th of August a special meeting was held; the crops in our vicinity being the subject, and it was agreed the yield was about as follows:

Wheat, three-fifths the usual breadth sown; yield about two-thirds that of last year, or one-quarter or more below the average per acre. Oats, nearly the usual breadth sown; yield about three-fifths the usual quantity per acre. Barley, none in the valley; in the hills about half the usual crop. Corn, the earliest and all that planted on dry, gravelly land, pinched by drought; the later planting a little better; very late planting quite poor; promising, as a whole, about two-thirds a usual crop. Hay, newly seeded meadows, a fair crop; old meadows, half the usual crop; total average, two-thirds the usual crop, but quality one-quarter to one-third better than usual. Pasturage, the shortest known for very many years. Potatoes, early potatoes one-third the usual crop; late potatoes promising better. Fruit, very abundant, except pears, and of good quality. Vegetables, short crop and of very poor quality.

On the 15th and 16th days of September the club held its third annual fair at Onondaga Valley. The first day was fair and pleasant, the attendance large, and the exhibition, in its various departments, was, in all respects, good; the second day, being rainy and unpleasant, interfered with the out-door part of the exhibition, yet

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the attendance was quite as large, and the show (save in the exhibition of stock), increased from the previous day.

The club has a library, to which additions have been made the past year. The volumes of the Transactions of the State Agricultural Society, the volumes of the American Institute reports, and the reports of the agricultural department at Washington, together with the Journal of the New York State Agricultural Society, and the monthly reports of the Commissioner of Agriculture, received by this club, have been of great value; and, after preserving a copy of each for our library, have been distributed to the members of the club.

The following are the officers for 1871: President, George W. Spalding, Onondaga Valley; Secretary, George B. Clark, Onondaga Valley; Treasurer, C. C. Marlett, Onondaga Valley.

GEORGE B. CLARK,
Secretary.

OSWEGO.

I have the honor to submit this the first annual report of the operations of the Agricultural and Horticultural Society of the town of Oswego. As this is the first report of this society, I deem it not inappropriate to give a short history of its formation. The Union Village Farmers' Club (the organization from which this has sprung) was first organized March 13th, 1869. Several of the first meetings were very sparsely attended, few of the farmers having any faith in the enterprise. The first essay was read May 8th, on butter-making, which called out a full attendance. Thenceforth this society has steadily increased in numbers and interest. Meetings have been held regularly semi-monthly, at which well prepared essays have been read and discussed. A fair was held September 16th, 1869, under the auspices of this society, which was so well patronized and gave such universal satisfaction that a permanent organization of a town society was urgently called for. A committee was appointed January 26th, 1870, with instructions to buy or lease grounds suitable for the purposes of the society. A stock company was formed to raise money to erect suitable buildings and improve the grounds. Twenty-six hundred dollars were soon subscribed, and on the 12th day of February, 1870, the charter of the Agricultural and Horticultural Society of the town of Oswego was filed at Albany; and before the 14th day of September, 1871, the grounds were graded and fenced, and one of the largest agricultural halls in the State erected thereon.

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The wing of the building, thirty by forty-five feet, is fitted up and furnished with seats, as a place for holding meetings for essays and discussions. The walls are embellished with pictures of rare beauty, which have been donated to the society.

The annual fair was by far the most successful exhibition yet held in the town, both in regard to merit and the patronage bestowed. The show of horses, cattle, etc., on the first day, was excellent, and spoke well of the success of the farmers of Oswego town in the raising of good stock.

The total number of entries in all departments was something over 650.

In fruit the display was particularly fine, though the number of exhibitors was not large. F. T. Carrington exhibited specimens of hot-house grapes; he also exhibited Flemish Beauty pears of enormous size, and superior Bartlett pears. Levi Pease exhibited splendid Bartlett pears, Beckwith peaches, and grapes. James Pierce was the largest exhibitor of fruit, and his specimens were very fine. Wilet R. Worden had a fine display of apples, and Daniel Perry competed successfully with several varieties of fruit.

Mrs. Albertus Perry was the largest exhibitor of vegetables, having no less than fifty-two varieties. This lady secured first prizes for winter squash (one specimen weighing sixty-eight pounds), Hubbard squashes, melons and pumpkins. Among the display were also splendid specimens of sweet corn (sixteen rowed), cabbages, English fluke potatoes, sample of oats weighing fifty-one pounds to the bushel, yellow globe turnips, etc. John Oliver had a large and fine display. He secured first prizes for one specimen of onions and Early Rose potatoes, the latter being of mammoth growth. T. S. Brigham exhibited a large and assorted table of vegetables, and was awarded a first prize for onions. Henry Sivers received the first prize for egg plant, and amongst a fine lot of vegetables was a mammoth sugar beet, measuring eighteen inches in circumference. Stewart & Son, from the city, had a fine display, and received first prizes for cabbages and tomatos.

Warren Coats received a first prize for a sample of white winter wheat. Hezekiah Cornish, first prize for sample of oats. Amos Pease, first prize for grass seed. John Oliver, first prize for peas and beans.

Dr. Place had a fine general display of vegetables, among which, squashes, onions, potatoes, beets and hops were particularly noticeable.

In the main apartment of agricultural hall were also exhibited

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a number of fine articles of manufacture and useful inventions. Luther Wetherby, from the city, exhibited two elegant carriages, one a top buggy and the other a double seated carriage, both of which were awarded premiums. J. N. Collins & Co., exhibited the New Empire Cooking Stove, the merits of which are becoming pretty generally understood in this part of the country.

M. Marshall, the personification of justice with his new patent scales, descanted upon the merits of the invention to a crowded audience during the day.

In the west transept was located the ladies department, where was displayed an endless variety of specimens of domestic handicraft, preserved fruit, works of art, curiosities, etc. The ladies of Hope Sunday school had a bazaar in one section, where they displayed for sale a variety of articles of fancy work, and were no doubt well rewarded for their laudable enterprise. The exhibitors in this department were very numerous, and many special premiums were awarded.

The attendance at the grounds was highly gratifying to the society, the city being largely represented, and the patronage of the ladies was particularly generous. About half past two o'clock, Rev. F. F. Jewell, of Oswego, was introduced by the president, and delivered the annual address, which was an able production of practical benefit, and the speaker was attentively listened to by a large assemblage. At the conclusion, a resolution was adopted requesting a copy for publication.

The report of the treasurer at the annual meeting held January 12th, 1871, shows the following exhibit:

Stock subscribed	$2,600 00
From festival, June 22d	295 00
As donations	190 00
Receipts at fair, September 14th and 15th	459 00
For membership fees to September 14th	55 00
Balance in treasury of last year	110 50
Received from other sources	111 25
	$3,820 75

DISBURSEMENTS.

Premiums, $247.25, less $60 donated to the society	$187 25
New building	2,300 00
Grading and fencing	1,298 50
Cash on hand	35 00
	$3,820 75

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In addition to the above there has been donated, in work on the grounds, some $300.

The officers of this society for the ensuing year are: President, Thomas G. Thompson; Secretary, Daniel R. Green; Treasurer, S. L. Parsons.

DANIEL R. GREEN.
Secretary.

OSWEGO FALLS.

The annual exhibition of the society was held at the village of Oswego Falls, within the territorial limits of the society, on September 20, 21, and 22, 1870.

The receipts and expenses are as follows, viz.:

RECEIPTS.

Cash on hand, as per last report	$2,030 22
From all other sources	3,338 13
	$5,368 35

EXPENDITURES.

Miscellaneous expenses and premiums	$2,373 32
Paid on account purchase of fair grounds	2,400 00
Cash on hand	595 03
	$5,368 35

During the year 1870 the society purchased the grounds in the village of Oswego Falls, heretofore rented and used by the society for holding the annual fairs. The purchase-price of said grounds was $5,400, on which $2,400 was paid.

The liabilities of the society are indebtedness on grounds, secured by bond and mortgage | $3,000
Premiums and expenses unpaid (estimated) | 106
| | $3,106

It is the design of the society to erect suitable buildings upon their grounds, as soon as their circumstances will permit.

The following are the officers for 1870: President, John H. Mann, Oswego; Secretary, Charles R. Smith, Fulton; Treasurer, Charles R. Nichols, Fulton.

CHARLES R. SMITH,
Secretary.

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OTEGO.

The Citizens' Agricultural Society of Otego report, for 1870, that they held their fair September 19th and 21st.

The receipts for the year were		$800 00
Expenses and premiums paid	$800 00	
Rent of grounds	100 00	
		900 00

Leaving the society indebted to the amount of $100.

W. E. ARNOLD,
President.

OTISCO.

The eighth annual fair of the Otisco Farmers' Club was held on the fair grounds, in the village of Amber, on the 28th day of September, 1870, and was everything to encourage and stimulate the friends of our enterprise. The weather was good, the attendance large, and the exhibition of stock was larger and more numerous than on some former occasions. The samples of butter and cheese showed that our town and vicinity around ranks high in the production of these articles. The samples of cereals and vegetables were of good quality, and more extensive than at some former fairs. The display of fruit was good, especially that of grapes, which are being cultivated near the eastern shore of Otisco lake. Floral hall was well decorated with flowers, paintings, fancy work, and articles of domestic manufacture, which must be credited to the ladies, they having here, as on former occasions, done their part well, and added much to the interest of the show. The department of implements and machinery was well represented.

The treasurer's report for the year 1870 makes the following exhibit of the financial condition of the society:

Cash on hand at the date of the last report	$54 40
Receipts during the year	191 87
Total	$246 27
Disbursements	$228 40
Cash in hands of treasurer	17 87
	$246 27

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The annual meeting of the club was held at the Agricultural Hall in Amber, January 2d, 1871. The following named persons were elected officers for the ensuing year: Lorenzo Bouttell, President; Charles E. Niles, Corresponding Secretary; James H. Redway, Treasurer.

JAMES H. REDWAY,
Treasurer.

PALMYRA.

RECEIPTS.

Amount on hand as per last report	$1,230 82
Exhibition of agricultural implements in June	186 00
Horse fair in July	72 51
Annual fair in October	936 65
Pasturage, rentals, etc.	244 50
Total receipts	$2,670 48

DISBURSEMENTS.

G. D. Downing, mortgage and interest	$1,273 09
Premiums at annual fair in October	604 79
For printing one hundred diplomas	60 35
Painting buildings	201 87
Insurance and other contingent expenses during the year,	265 74
Balance on hand	264 64
	$2,670 48

C. D. JOHNSON,
Secretary.

POMFRET.

The fifteenth annual meeting of the Farmers and Gardeners Club, of Pomfret, was held ninth January, instant. The officers were re-elected for the current year, as follows, viz.: President, Ira Porter; Secretary, Treasurer, and Librarian, A. Z. Madison. After the election of officers a discussion was had on the destruction of weeds.

The present number of members is fifty-five, part of whom are merely nominal. Besides the State and national reports, etc., we have a miscellaneous library of sixty-two volumes. Our stated meetings, at present, are on the second and fourth Monday evenings of each month. During the past summer we met in the afternoon, from farm to farm, monthly, as previously advertised.

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A grange of the patrons of husbandry was organized at Fredonia in 1868. Some of the members of this club are also members of that organization. In July last an arrangement was made between the two associations for a show, and a joint committee was appointed to carry out the objects contemplated. Of this executive committee the officers of the show were appointed, to wit: George D. Hinckley, President; James M. Lowell, A. S. Moss, Chas. F. Matteson, Vice-Presidents; Ira Porter, General Superintendent; A. Z. Madison, Secretary and Treasurer. Under the direction of the above named officers an indoor exhibition, entitled, the Union Horticultural and Agricultural Show, of Fredonia, consisting of flowers, fruits, vegetables, grain, and such variety of indoor articles as could be accommodated, was held in Concert Hall, on the 21st, 22d, and 23d days of September, 1870.

In the evenings of the last two days essays were read on several subjects previously designated, viz.: By Mr. Porter, on "Forage Plants;" by Mr Moss, on "The Potato;" by T. S. Hubbard, on "The Grape." These were all interesting and instructive.

Others anticipated were: "The Growth and Marketing of Small Fruits," and "The Monopoly of Transportation Companies." Circumstances prevented those to whom they were assigned, from reading them.

There were about sixty exhibitors, some of whom displayed more than forty varieties of apples, thirty of grapes, etc. The premiums awarded were appropriate diplomas.

Altogether, it was a success; the receipts exceeding the disbursements, so that a balance was left in the treasury, and a good time generally enjoyed by the hundreds who visited the show, and witnessed the best display of the kind that they had ever seen.

A. Z. MADISON,
Secretary

PROSPECT PARK.

The Prospect Park Fair Ground Association held its first annual fair on the grounds of the association, at Gravesend, Kings county, on the 11th, 12th, 13th, 14th and 15th days of October.

The attendance the first day was not large, and it was devoted principally to entries, and arranging of stock and articles for exhibition. The second day opened with a severe rain storm, which continued all day.

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In vegetables there was a large variety, which were all of the best quality. A general assortment of farming implements was on the ground, and received much attention. The show of cattle was not what it should have been; that of sheep and swine better. The entries in the dairy department were not numerous, but the show and quality good.

The exhibition of horses was large and fine, the display of carriages the finest ever exhibited.

RECEIPTS.

Entrance fees and carriage tickets	$5,149 51
Special premium fees	2,005 00
Balance due treasurer	1,678 53
	$8,833 04

EXPENDITURES.

Premiums and diplomas	$1,776 00
Special premiums	3,400 00
Music, printing and advertising	1,870 42
Forage, labor, etc.	650 00
Sheds for carriages and cattle	1,136 62
	$8,833 04

E. O. READ,
Secretary.

RAQUETTE VALLEY AND ST. REGIS VALLEY.

The undersigned, secretary of the Raquette Valley and St. Regis Valley Agricultural and Horticultural Society, submits their first annual report.

Said society was organized by filing the certificate required by law in the office of the Secretary of State, August 12th, 1870, and in the office of the clerk of the county of St. Lawrence, on the 9th day of August, 1870. The place of business of said society, as stated in said certificate, is Potsdam, county of St. Lawrence, State of New York. The particular business of said society, as stated in said certificate, is improvement in agricultural, horticultural and mechanical knowledge and practice.

That said society purchased at the times hereinafter stated, the real estate below mentioned upon the terms and conditions following:

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1. Of William H. Hawkins $8\frac{85}{100}$ acres of land, for which was to be paid the sum of $3,750; of which the sum of $1,125 was paid down, and the balance is secured by the bond of the society, secured by mortgage upon the land, payable $750 and interest on the whole sum remaining unpaid May 1st, 1871; $1,125 and interest on the whole sum unpaid, payable 15th September, 1871, and the balance and interest May 1st, 1872.

This parcel of land was conveyed to the society by warranty deed from said Hawkins and wife, dated September 1st, 1870, acknowledged same day, recorded in St. Lawrence county clerk's office, September 3, 1870, in liber 88 C of deeds, page 262, etc.

2. The society purchased of William Matthews $1\frac{74}{100}$ acres of land, for which it paid down $600, that being the full amount of the purchase money; said land was conveyed to the society by said Matthews and wife by warranty deed, dated September 19, 1870; acknowledged September 20, 1870; recorded in St. Lawrence county clerk's office September 22, 1870, in Liber 88 C of deeds, at page 441, etc. The additional sum of $4.29 was paid for interest on said sum of $600.

3. On 10th of September, 1870, the society purchased by contract, in writing dated that day, of Elizabeth E. Partridge, Frederick G. Partridge, and H. Gertrude Partridge a parcel of $9\frac{11}{100}$ acres of land for the sum of $2,733, to be paid in five equal annual instalments from the said first day of October, 1870, with annual interest on all sums unpaid to be reckoned from the 1st of September, 1870.

That the above parcels of land adjoin, are situate in the village of Potsdam aforesaid, and are all the lands or interest in lands owned by said society. That said society has enclosed said lands with a good and substantial fence; has constructed a trotting course one-half mile around thereon; has erected good and substantial seats capable of seating about 1,500 persons; has purchased and moved upon said lands, and repaired, a building for the use of said society. That said lands have been purchased as aforesaid, and have been enclosed and used as fair grounds for the said society. That on the 4th, 5th, and 6th days of October, 1870, the society held its first annual fair on its said grounds at Potsdam, and previously to said fair premiums had been offered for articles exhibited thereat. That the receipts and expenditures of said society, since its organization, have been as stated and set forth in the report of the treasurer hereto attached; and that the officers of said society, with their present places of residence, are as follows: President, Charles O. Tappan, Potsdam; Secretary, Harvey M. Story; Treasurer, Luke Usher.

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RECEIPTS.

Sale of life membership tickets	$1,560 00
Single and annual entrance fees at fair	2,738 62
Rents during fair	348 00
Contributions for trials of speed	356 86
Bills payable	1,804 82
	$6,808 30

DISBURSEMENTS.

On land purchased	$1,729 37
Materials used in construction of buildings, seats, and fences	1,628 62
For labor	1,978 69
Printing and advertising	209 95
Balloon ascension and band	335 00
Stationery and postage	7 01
Premiums claimed and not donated to society	489 73
Premiums on trials of speed	425 00
Cash on hand	4 93
	$6,808 30

CHARLES O. TAPPAN,
President.

RIVERHEAD.

This society held its meetings weekly between the 1st of September and 1st of May, and they were well attended. Its members number fifty, and it has a library of seventy volumes.

Its annual meeting was held January 13th, 1871. The following officers were elected for the ensuing year: S. O. Benjamin, President; Zachariah Hallock, Secretary; Samuel Tuthill, Treasurer.

Receipts for the year, consisting of members' fees	$25 00
Expenditures for the year	6 37
Balance on hand	$18 63

This society has co-operated largely in the purchase of Peruvian guano for the past four years. This past year its expenditures amounted to over $10,000, purchased by our agent from the Peruvian agent in New York, making a saving to the society of over fifteen per cent by operating through first hands.

ZACHARIAH HALLOCK,
Secretary.

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RUSHVILLE.

The secretary of the Rushville Union Agricultural Society reports as follows:

The receipts of the society for the year ending January 11th, 1871, were:

Balance on hand from last year	$629 57
Proceeds of the last fair	387 97
	$1,017 54

The expenditures were as follows:

Premiums at last fair, October, 1870	$335 25
Printing	54 25
Police	12 50
Additional grounds for enlargement	50 00
Expenses of fair	92 43
Attending gates	29 00
Repairs of buildings and fences	393 56
Balance on hand	50 55
	$1,017 54

The annual fair for 1870 was held October 4th and 13th, at Rushville, Yates county. The weather being so very unfavorable the first day, the fair was adjourned to October 13th, when the weather being more favorable, the entries were quite as numerous as we expected, under the circumstances; but the receipts fell short of what we had anticipated, the weather being unfavorable.

The following officers were elected at the annual meeting, January 18th, 1871, to serve for the year 1871: Chas. M. Hicks, President; Lyman Loomis, Secretary; Ira D. Bryant, Treasurer.

The post-office address of the above named officers is Rushville, Yates county, N. Y.

N. H. GREEN,
Corresponding Secretary.

SANDY CREEK, RICHLAND, ORWELL AND BOYLESTON.

The thirteenth annual exhibition of the Sandy Creek, Richland, Orwell and Boyleston Agricultural Society, was held on the grounds of the society at Sandy Creek, Tuesday and Wednesday, September 13th and 14th, 1870. The weather was fine and the attendance large, and arrangements complete. The exhibition, in many respects, was more encouraging and successful than former exhibitions.

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Profiting by the experience of past years, and being desirous of emulating the example of other successful sister societies, we have expended during the year, nearly one-half of the surplus funds of the society, in beautifying the grounds and building new buildings for the offices of the society, which, with the large commodious halls, previously erected, make the society's inclosure very attractive and convenient.

A gradual advance and healthful progress in agriculture, may be noticed in this section of Oswego county each succeeding year.

The improvement in farm buildings is noteworthy, and evinces in an unmistakeable manner, the prosperity of the farmer in this section of the county, and the regard he has for the comfort of his stock.

A fine graded track of half a mile in length, on which the speed and merits of horses are tested, encircles the ground, the whole being inclosed with a high permanent board fence.

The show of cattle was good; I think fully equal to any former exhibitions. The display of horses was very fine, embracing many noble animals exhibiting traits of endurance, speed and almost faultless form. The show of sheep was not large, and mostly native. Swine were shown, though the numbers were reduced from that of former exhibitions. The display of fruit was excellent, and equally so with vegetables. The exhibition of butter and cheese was excellent, and more especially the display of factory cheese, which was unusually large, and pronounced by the judges of superior excellence.

At 4 P. M. on the last day of the exhibition, Prof. H. D. Squires made an excellent ascension in his famous balloon Atlantic.

The treasurer's report represents the finances of the society as follows:

Amount on hand December 1st, 1869	$831 30
Received at exhibition of 1870	1,548 87
	$2,380 17

Paid in premiums and repairs	$1,570 67
Balance on hand December 1st 1870	809 50
	$2,380 17

The following named persons have been elected officers of the society for 1871: Orin R. Earl, President; Delos E. Wilds, Secretary; Pitt M. Newton, Treasurer.

D. E. WILDS,
Secretary.

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SANGERFIELD AND MARSHALL.

RECEIPTS.

Balance	$164 45
Receipts of fair	549 90
	$714 35

DISBURSEMENTS.

Premiums	$309 00
Expenses	229 68
Balance	175 67
	$714 35

The following officers for the Sangerfield and Marshall Agricultural Society are elected for the ensuing year: President, H. B. Titus; Secretary, H. M. Rouse; Treasurer, J. M. Bissell.

H. M. ROUSE,
Secretary.

SKANEATELES.

The proceedings of the Skaneateles Farmers' Club for 1870 are summed up in the holding of its sixteenth annual fair, October 4th and 5th. This exhibition was an average success, notwithstanding unfavorable weather, and was the fifth annual fair at which we have awarded agricultural periodicals and books, gradually increasing the aggregate value of premiums offered from year to year, with general satisfaction. Admittance fee to hall this year, fifteen cents; members' and exhibitors' tickets, admitting families, including minor children only, fifty cents. No horse trotting connected with our exhibitions.

TREASURER'S REPORT, DECEMBER 31ST, 1870.

Balance on hand January 1st, 1869	$186 85
State appropriation	82 87
Memberships and receipts of fair	207 66
Subscriptions	30 00
	$507 38

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Traveling and hotel expenses	$4 86
Postage and express	5 09
Fair expenses	35 79
Premiums	176 00
Printing	30 00
Rent	75 00
Miscellaneous	15 55
Balance in treasury	165 09
	$507 28

The following officers of the Skaneateles Farmers' Club were duly elected at our annual meeting, January 7th, for the year 1871: President, Emerson H. Adams; Secretaries, Wills Clift and J. H. Earll; Treasurer, David Waldron.

WILLS CLIFT,
Secretary.

SPENCERPORT.

Our club held its election at its last meeting. The following gentlemen were elected: William Brown, President; Charles S. Hiscock, Secretary; G. W. Hiscock, Treasurer.

CHARLES S. HISCOCK,
Secretary.

SUSQUEHANNA VALLEY.

The fourteenth annual fair and cattle show of the Susquehanna Valley Agricultural Society was held on the grounds of the society in the village of Unadilla, on Wednesday, Thursday and Friday, the 5th, 6th and 7th days of October, 1870. Embracing as it does within its jurisdiction eight towns in the three counties of Otsego, Delaware and Chenango, and these towns rich and productive, the display of animals and articles at every fair must needs be large, and is indeed highly creditable to the exhibitors; while the ladies, with their smiles and handiwork, do their full share in making our fairs pleasant and attractive.

These annual holidays or gatherings call together a large crowd of people, and in a social way are well worth the cost and trouble attendant upon the exhibitions; while the increase of agricultural knowledge by comparisons in display and otherwise, is shown in its beneficial results on all the country round.

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The entries numbered about 800.

The receipts of the fair, for membership tickets, admissions and from other sources, were..... $1,007 85

DISBURSEMENTS.

Premiums, cash	370 80
Agricultural papers	147 50
Speaker	50 00
Band	25 00
Rents of grounds and pasturage	164 00
Printing	65 00
Incidental expenses	185 55
	$1,007 85

On the last day of the fair the Hon. Stephen L. Mayham, of Schoharie county, gave us an eloquent address, replete with practical suggestions to the farmer, and in fact to all; it was indeed highly satisfactory.

This society has now been in existence and held its fairs fourteen years, and all this time without any aid from any other source than the people themselves in the jurisdiction of the society. The State Agricultural Society has aid from the State, the county agricultural societies have aid from the State and are accumulating funds in their treasuries; but town societies have to struggle along without external aid, while they are doing their full share in disseminating agricultural and scientific knowledge among the people. Is this just? Ought not the law to be amended so that town societies should have some aid as well as the State and the county societies?

The annual report of the State Agricultural Society and of the American Institute prove beneficial, and are eagerly sought after.

This society, at its annual meeting, on the 24th December, 1870, elected C. Porter Root, of Butternuts, President; Frank B. Arnold, of Unadilla, Secretary; and George B. Fellows, of Unadilla, Treasurer, for the ensuing year.

GEORGE B. FELLOWS,
Treasurer.

THORN HILL.

The Thorn Hill Farmers' Club herewith transmit their annual report. We have held during the year several meetings, at which subjects of interest to farmers have been discussed. We have also

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held a fair, at which premiums amounting to forty-four dollars were awarded and paid. The report of the treasurer is as follows:

Balance from ex-treasurer	$35 41
From memberships	13 00
State appropriation	82 87
	$131 28
Expenditures	$62 58
Amount on hand	68 70
	$131 28

The officers for the coming year are as follows: Francis E. Burns, President; S. S. Kneeland, Treasurer; Allen Brown, Secretary

ALLEN BROWN,
Secretary.

TRENTON UNION.

We, the undersigned officers of the Trenton Union Agricultural Society, report for 1870 that our fair grounds are situated in the town of Trenton, Oneida county, and that the society embraces six towns in Herkimer county and eight towns in Oneida county.

Total amount received	$1,056 59
Paid out	865 86
In hands of treasurer	$190 73

to pay towards the indebtedness of the society, which is $476.67, and interest some thirty dollars.

STORRS BARROWS,
Secretary.

ULYSSES, COVERT AND HECTOR.

The annual fair of the Union Agricultural and Horticultural Society, of the towns of Ulysses, Covert and Hector, was held September 20th, 21st and 22d, and was well attended, and pecuniarily was a success. The entries in all departments were over 500, and although not as many as on some former occasions, yet they were far superior, showing since the organization of the society (this being the twelfth fair) a steady improvement in quality of everything exhibited. There were ninety-eight entries in the horse department, and over fifty of cattle, and all very fine stock.

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The following is from the treasurer's report:

CREDITS.

By cash received from Wm. Pierson, last treasurer	$138 48
Membership tickets	626 00
Single tickets	557 05
Rents, etc.	101 86
	$1,423 39

DEBITS.

Premiums paid	$378 25
Repairs to buildings	72 15
Rent of ground	200 00
Other expenses	311 25
Paid on old society note	175 34
Cash lent	275 00
Cash on hand	11 40
	$1,423 39

The annual meeting was held January 14, 1871, at which the following officers were elected: Warren Halsey, of Trumansburgh, President; Nelson Noble, of Trumansburgh, Secretary; Truman Boardman, of Trumansburgh, Treasurer.

T. BOARDMAN,
Treasurer.

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VERNON.

As secretary of the Vernon Agricultural Society, I would respectfully submit to you our report for the year 1870.

In some respects we have been successful, in others unfortunate. Unfortunate as regards our building for exhibitions, which we had built just previous to our fair of 1869. It was put up in a very convenient place on the grounds, but a very windy one; yet the builders considered it safe. But during one of the heavy storms of the winter of 1869 and 1870, it was blown down. Our officers with commendable zeal, decided to rebuild, and did so, locating it in a beautiful grove on the grounds, and inclosing it so that it can be locked up, and no more exposed to winds than ordinary buildings. This caused quite a heavy outlay of funds, and compelled the society to run in debt some $150, which we hope to clear up in 1871.

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Our fair proved a success; perhaps a little short on cattle. But on some classes of horses, sucking colts especially, decidedly superior; many good judges saying they never saw so many fine sucking colts together before at any fair; while the ladies' department, fruits, vegetables, flowers, etc., was never better.

Our receipts were about $300, of which we appropriated for premiums $125; the balance was used for expenses and upon the building.

Our officers for the year 1871 are as follows: President, Barnes Davis; Secretary and Treasurer, L. A. Griswold.

L. A. GRISWOLD,
Secretary.

VIENNA.

The annual fair of the Vienna Agricultural Society, held on the society's grounds in North Bay, on Monday, Tuesday and Wednesday, September 12th, 13th and 14th, 1870, was well attended, and the receipts were larger than ever before. The expenses were considerably more than usual, leaving but a small balance of the receipts to the credit of the society. The floral hall was well filled, and principally with articles of merit. The exhibition of stock improves every year, owing in part to the increase of premiums.

The officers for the ensuing year are as follows: Aaron Bushnell, President; Peter Flanagan, Treasurer, and Frank Noble, Secretary.

The following is the financial condition of the society:

Receipts of 1870	$347 61
Expenses	339 76
Balance	$7 85
In treasurer's hands before fair	140 86
Interest on same	9 86
Total for 1871	$158 57

Since the fair weekly meetings have been held for agricultural debates.

FRANK NOBLE,
Secretary.

WADDINGTON.

The Waddington Agricultural Society was incorporated by special act of the Legislature, April 30, 1869, and held its first fair on the society's grounds, in September of that year. The act provides that

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the capital of the corporation be $3,000, which may be increased to $10,000, the stock being divided into 300 shares of $100 each, of which $65 was paid; and that there shall be for the management of its affairs, a board of nine directors, from whom are to be elected a president, vice-president, secretary and treasurer. The grounds were purchased at a cost of nearly $1,600, on which $500 was paid down, the balance to be paid in five annual installments with interest, and comprise about twenty-three acres. Work was at once begun; a half mile track with stables, grand and judges' stand, beside the fences and offices, occupied the time and fully used the funds on hand up to the first meeting. Temporary floral and mechanics' halls were erected, together with sheds and pens; there was, notwithstanding, an excellent show, and the net proceeds, about $1,200, enabled the directors to pay off all debts of the society, as also $500 on the purchase of the grounds; $500 were given in premiums; and the address was delivered by the Hon. A. X. Parker, of Potsdam.

At the annual meeting for the election of directors, on the first Monday in January, two only of the old board were changed, and the same officers were re-elected. Encouraged by their success, the board voted that plans and specifications be issued for the building of a floral hall, the cost not to exceed $900, and that a sum not in excess of $200, be expended for the improvement of the grounds. A contract for the building was effected at the sum named, and finished in time to be occupied during the fair of 1870. It was pronounced to be tasty and convenient, and added much to the appearance of the grounds. A well which was much needed was dug, and the balance of the sum appropriated judiciously expended for the purpose voted. The premium list this year was increased to $1,100. The proceeds of the fair, amounting to $2,216.88, were sufficient to pay $100 on the contract for the land, and all claims against the society, leaving us entirely free from debt with no liabilities, save the balance of $550 still due on the grounds.

The address this year was delivered by Hon. A. B. James, of Ogdensburgh. Our last annual meeting resulted in but few changes in the board of directors, and none among the officers. The next meeting was fixed for the 5th, 6th and 7th of September coming.

The interest manifested by the farmers, and the assistance rendered by them in forwarding our efforts, deserve and have our sincere appreciation, and goes to prove the falsity of the old adage: "That one can have too much of a good thing," at least in agricultural matters. There are, besides several others in the county, two agricultural

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societies who hold their meetings within eighteen miles of us; the County Society at Canton, and the Raquette Valley and St. Regis Valley Society at Potsdam, the latter started this year. So far from this interfering in any way with our success, or our being any drawback to theirs, the attendance has been larger, and the exhibitions better than at any previous meetings. The advantage of the frequencies of these meetings is becoming realized as supplying a want much felt by our farming community, viz., that of exhibiting their produce and stock for sale, which fairs in their immediate vicinity enable them to do at small expense.

Aside from the improvement of agriculture, for which this society was organized, it has a deep interest for its success as being the only effort for public improvement ever made here. Situated on the glorious old St. Lawrence, with a water-power unsurpassed in the State, and almost every advantage that nature can supply, for lack of nine miles of railroad we are shut off, except in summer, from the outer world, our farmers have hitherto under-estimated their power, but the success of this effort has begun the lesson which it will go far to teach, that they have but to will to do.

In recapitulation, on sixty-five per cent of five-sixths of our original stock of $3,000, which is all that has been disposed of, the remaining one-sixth being still unsold, we have expended on our grounds and buildings about $4,500, besides paying $1,100 on the purchase of the land.

W. M. M. OGDEN,
President.

WESTMORELAND.

The undersigned officers of the Westmoreland Agricultural Society make the following report of the doings of the society and condition at the close of the year 1870:

The fourth annual fair of the society was held on its grounds in the village of Hampton, on the 5th, 6th, and 7th days of October. The weather was pleasant, which ensured a complete success to the society very gratifying to all in attendance.

Nearly all departments were well filled. The address was delivered by Hon. W. B. Bliss, of Rome, and was listened to with great interest. The following are the officers elected at the annual meeting held January 11, 1871, for the ensuing year: David N. Parke, President; L. H. Shattuck, Treasurer; V. C. Smith, Secretary.

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TREASURER'S REPORT.

Balance on hand in treasury	$51 44
Receipts for 1870	450 65
	$502 09
Expenditures	484 65
Balance on hand	$17 44

V. C. SMITH,
Secretary.

WINFIELD UNION.

Whole number of entries at last fair 664, including 155 of live stock.

RECEIPTS.

Balance in treasury as per last report	$6 06
Receipts since date of last report	1,163 75
	$1,169 81

EXPENDITURES.

Premiums paid	$590 63
Expenses paid	547 22

Number of books received from the State Society, twenty; valuation of the society's property, $250.

J. B. MURRAY,
Secretary.

YORKTOWN.

The fourteenth annual fair of the Yorktown Agricultural and Horticultural Society was held upon the society's grounds near Crown Point, on Wednesday, Thursday, and Friday, September 28th, 29th, and 30th. Owing to the severe storm, the fair did not close until Saturday, on which day an able address was delivered by the Hon. James W. Husted. The exhibition, in all the departments, was fully equal to any previous one, but the receipts came considerably short, as the attendance was small. The following is a summary statement of our finances:

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Balance in treasury from 1870		$242 52
Received from members' tickets		139 00
Gate fees		375 00
Rent of tent		58 00
Total		$814 52
Expenses as per treasurer's report	$502 42	
Premiums paid	332 80	
		835 22
Due the treasurer		$20 70

The officers for 1871 are as follows: B. Flewelling, President; D. F. Lee, Treasurer; Constant White, Secretary.

CONSTANT WHITE,
Secretary.

INDIAN AGRICULTURAL SOCIETIES

CATTARAUGUS RESERVATION.

The trustees of the Iroquois Agricultural Society on the Cattaraugus reservation, respectfully beg leave to submit the following report for the year 1870:

Officers, Perry John, President: Jaris Pierce, Secretary; John Kennedy, Treasurer. These officers are also *ex officio* the executive committee of the board of trustees.

No funds having remained from the previous year, while yet about eighty rods of board fence required to be built to complete the enclosure of the fair grounds, the committee were driven to the necessity of issuing orders payable after the fair. Finding men willing to labor and to furnish materials on such conditions, they finished the inclosure, and erected a building for a ticket office, improved the track, provided a better supply of water, and made sundry other improvements, which brought the society somewhat heavily in debt and rendered it very necessary that the fair should be a pecuniary success. With this end in view, they reduced the premiums offered to the very lowest rate, consistent with keeping up a spirited competition; so low, in fact, on some articles, as to damage the display to a certain extent, notwithstanding the pains taken to show the competi-

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tors the absolute necessity of such a course. The fair was held on the 13th, 14th, 15th and 16th days of September. The first of these days was devoted wholly to the taking of entries of which there were in all 960; of which 697 were for agricultural products; 175 for the various kinds of stock; 59 for products of domestic skill and labor, and 28 for products of mechanical ingenuity.

The show, though in some articles not fully up to that of the previous year, was nevertheless, pronounced by competent judges to be very fine, especially in all departments of agricultural products. The weather was favorable and everything indicated complete success, when to our consternation we ascertained that the country around us was flooded with handbills setting forth that the reservation was full of the "black measles," and that the Indians were dying off rapidly, etc.

This false report was set in circulation just one day too late for the contradiction to reach those who were deterred by it, in season to secure their attendance; and our receipts were diminished, in the estimation of good judges, at least, from $300 to $400. We were aware that another society was holding its fair about twenty miles away, but were not conscious of having done anything to provoke such a mode of competition.

The result was that our receipts were not sufficient to pay the fair ground and running expenses, and at the same time pay the full amount awarded as premiums. The accompanying report of our treasurer, shows the amount actually paid, and there is still due for premiums the sum of $221.70 besides the balance due the treasurer, leaving the society in debt at the present time $350.69.

RECEIPTS.

Received previous to the fair	$15 00
Taken at the gate	932 41
Members and licenses	326 50
Received by the secretary	106 50
Received from the treasurer	127 99
	$1,508 40

EXPENDITURES.

Premiums paid	$345 55
Labor and materials for improving the fair grounds and expenses of conducting the fair	1,162 85
	$1,508 40

PERRY JOHN, *President.*

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TONAWANDA RESERVATION.

The fair of the Iroquois Agricultural Society of the Tonawanda reservation, was held on their fair grounds, on the Tonawanda reservation, commencing September 28th and ending October 1st, 1870. The amount of money received since the last annual report is $513.50. The disbursements were as follows:

Premiums	$164 00
Sundry persons	254 50
Stationery	3 50
Printing	40 00
Police and gate men	44 50
	$513 50

CHARLES W. DOCTOR,
Secretary.

ONONDAGA RESERVATION.

In pursuance of an act of the Legislature of the State of New York, passed at the session of 1870, the undersigned hereby makes the first report of the transactions of the Onondaga Indian Agricultural Society, located on the Onondaga Indian reservation, in the county of Onondaga and State of New York.

It is proper to state that in 1869 and, for some time previous, the project of forming an agricultural society among the Onondagas had been discussed; and, perceiving the great social advantage to be derived from such an association, as a means of vast material improvement among them, a meeting was held and arrangements made for an agricultural exhibition, which was held in October, 1869, and with such marked success as to fully warrant a permanent organization; and accordingly application was made to the Legislature for an act of incorporation, which was granted, as above stated; and in pursuance of the provisions of such act of incorporation, an agricultural fair was held on the grounds of this society on the 21st, 22d, 23d and 24th days of September last. There was commendable zeal manifested by the Onondagas in competing for the various prizes offered by this society, and a very general attendance of the Onondagas, as well as representatives from the various Indian tribes of this State, and a large number of white people.

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This society has leased, for the purpose of holding its fairs, a piece of land containing about twenty-six acres, nearly in the centre of the reservation, and exceedingly well adapted for such purpose, the same being inclosed with a good substantial fence. The society have erected on their grounds a building twenty by twenty-eight feet in size, and sufficiently commodious for the present wants of the society. A good well has also been sunk, and affords an ample supply of the best quality of water for the stock and for all other needs of the society.

There were 368 entries of all classes and a fine display of horses, cattle, swine, poultry, sheep, farm implements, various kinds of agricultural products, preserved fruits, needle and bead work. The last day of the fair was devoted to trials of the speed of horses and a foot race between two celebrated Indian pedestrians, a good track for such purposes having been prepared on the fair grounds.

Dr.

To amount received for	annual memberships	$47 00
" "	one life membership	10 00
" "	admission fees	211 31
" "	licenses to peddlers, etc	27 00
		$295 31

Cr.

By amount paid for	books and stationery	$3 00
"	lease of grounds for holding fair	40 00
"	printer's bills	25 00
"	police, three days and two nights	20 00
"	erecting buildings and preparing grounds	75 00
"	digging well on fair ground	25 00
"	premiums	224 08
		$412 08

Leaving the society in debt at the time of making this report $116.77.

DANIEL LA FORT,
Secretary.

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ADDITIONS TO THE LIBRARY AND MUSEUM, DONATIONS, ETC., 1870.

REPORTS OF AGRICULTURAL AND OTHER SOCIETIES, ETC.

AMERICAN.

Annals of the Lyceum of Natural History of New York, 1869–70; vol. 9, pages 141 to 344.

Fifteen copies of the Agricultural Report of Missouri for 1868; from C. W. Murtfeldt, Secretary.

Monthly sheets of the Proceedings of the Boston Society of Natural History, for the year 1870.

Thirty-first and Thirty-second Annual Reports of the Board of Education of Massachusetts.

Report of the Board of Trustees of the Agricultural College of Pennsylvania, for the year 1869.

Ten copies of the Report of the Secretary of the Iowa State Agricultural Society, for the year 1869; from J. M. Shaffer, Secretary.

Fifth Annual Report of the American Dairymen's Association for the year 1869, containing also the Annual Report of the Ohio Dairymen's Association for 1869.

Journal of the American Geographical and Statistical Society, vol. 4, part 2, 1870; from Hon. Charles P. Daly, President.

Transactions of Jefferson County Agricultural Society for 1869.

Two copies of the Seventeenth Annual Report of the Suffolk County Agricultural Society for 1869, containing the address of Hon. William Nicoll.

Thirty copies of the Seventeenth Annual Report of the Secretary of the Massachusetts Board of Agriculture for the year 1869; from C. L. Flint, Secretary.

The First Annual Report of the American Museum of Natural History, January, 1870.

From C. W. Murtfeldt, Corresponding Secretary, twenty-four copies of the Fifth Annual Report of the State Board of Agriculture of Missouri for the year 1869.

Thirteenth Annual Report of the Warren County Agricultural Society; Glen's Falls; 1869.

Fifty-first Annual Report and Transactions of the Hampshire, Franklin and Hampden Agricultural Society, for the year 1869.

From O. S. Bliss, Secretary, Transactions of the Vermont Dairymen's Association for 1869–70, with Addresses and Essays.

Twelve copies of the Eleventh Annual Report of the Indiana State Board of Agriculture, and the Report of Professor E. T. Cox, State Geologist, with accompanying maps.

Six copies of the Transactions of the Rhode Island Society for the Encouragement of Domestic Industry; 1869.

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Thirty copies of the Fourteenth Annual Report of the Secretary of the Maine Board of Agriculture, for the year 1869.

Transactions of the State Agricultural Society of California, for 1868–9; from Robert Beck, Secretary.

Proceedings of the Annual Convention of the South Carolina Agricultural and Mechanical Society, held in Columbia, S. C., November 10–12, 1869.

Reports of Trials of Farm Implements by the Bucks County (Penn.) Agricultural Society, in 1869; (broad sheet).

Twenty-five copies of the Report of the Commissioner of Agriculture for the year 1868; Washington, D. C.; from Hon. Horace Capron, Commissioner.

Twenty-five copies each of the Monthly Reports of the Department of Agriculture, for 1870; from Hon. Horace Capron, Commissioner.

Transactions of the Massachusetts Horticultural Society for 1869; Boston.

Proceedings of the Third and Fourth Annual Exhibitions of the Colorado Agricultural Society, held at Denver, September 29 and 30, and October 1, 2 and 3, 1868, and September 22, 23, 24 and 25, 1869.

Ten copies of the Transactions of the Homœopathic Medical Society of the State of New York; vol. 7, 1869; from Dr. H. M. Paine, Secretary.

FOREIGN.

Transactions of the Highland and Agricultural Society of Scotland; Edinburgh, 1870; vol. 3, part 1; from the Society.

Journal of the Royal Agricultural Society of England. Second series; vol. 6, parts 1 and 2; from the Society.

Monthly Journal of the Transactions of the National Academy, Agriculture, Manufactures and Commerce, and of the French General Statistical Society, 1870.

Journal of the Agricultural Association in Bavaria, 1869; from the Bavarian government.

The Journal of the Agricultural Society of New South Wales; vol. 2, No. 7, 1870.

Agricultural Central Journal of Germany, Berlin; vol. 18, 1870.

Annals of Agriculture, in the Royal Prussian States; Monthly Journal, Nos. 7–12, 1868, and Nos. 1—12, 1869, and Weekly Journal, Nos. 27 to 52, 1868, and Nos. 1 to 51, 1869. Berlin; through Dr. Flügel, Leipsic.

Agricultural Gazette of the Prussian Provinces; Nos. 1 to 13, and 40 to 52, 1869; and 1 to 13, 1870. Königsberg.

Fifty-eighth Report of the Agricultural Association of Bavaria, 1868. Munich.

Report of the Sessions of the Royal Bavarian Academy of Science in Munich; 1867, vol. 2, Nos. 3 and 4; 1868, vol. 1, Nos. 1, 2, 3 and 4; vol. 2, Nos. 1, 2, 3 and 4; 1869, vol. 1, Nos. 1, 2, 3 and 4; vol. 2, Nos. 1, 2 and 3; from the Royal Bavarian Academy of Science.

Report of the Agricultural Division of the International Fair at Paris, 1867. By E. V. Salviati, part 1, Berlin; from the Prussian Ministry of Agriculture, through Dr. Flügel.

Yearly Report of the Agricultural College of Prussia, for the year 1868.

Report of the Sessions of the Central Imperial Agricultural Society of France; No. 3, 1867 and 1868. Paris.

The Memoirs of the Central Imperial Agricultural Society of France; First and second parts, 1866. Paris.

Yearly report of the Royal Central School of Agriculture; Weihenstephan, Bavaria; for 1868 and 1869.

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Report of the Ballarat Agricultural and Pastoral Society, for the year ending May 7, 1870.

Tenth Report and Transactions of the Offenbach Society of Natural Philosophy, May, 1868, to June, 1869.

Annals of the Nassau Natural Philosophy Association; from Dr. C. L. Kirschbaum, Wiesbaden.

Transactions of the Royal Zoological-Botanical Society in Vienna; nineteenth vol. 1869, with eighteen plates; through Dr. Flügel.

The Tenth Annual Report of the Board of Agriculture of the Province of New Brunswick; Charles S. Lurgrim, Secretary.

Report of the Commissioner of Agriculture and Arts for Ontario, for 1869; Toronto; four copies from Prof. Buckland.

Bulletin of the Imperial Society of Naturalists of Moscow; Nos. 1, 2, 3 and 4, 1869.

Agricultural Journal of the Duchy of Oldenburg; complete for the years 1868 and 1869.

Oversigt over det Kongelige danske Videskabernes Selskabs Forhandlinger og dets Medlemmers Arbeider; No. 5, 1868; No. 2, 1869, and No. 3, 1869; Copenhagen.

Communications to the Society for the Dissemination of Natural Science in Vienna; Nos. 2 to 9; from the Society.

Proceedings of the Lombardian Royal Institute of Sciences and Letters; series 2, vol. 1, Nos. 1 to 20, 1868; vol. 2, Nos. 1 to 11, 1869; Annual Meetings of 1867 and 1868; Proceedings of the Division of Mathematics and Natural Science; vol. 10, parts 1–5; and vol. 11, part 1.

Weekly Gazette of the Society for the Advancement of Horticulture in the Royal Prussian States for Gardening and Botany; edited by Dr. Karl Koch, Berlin, for the year 1869.

LIBRARY.

Report of the New York Hospital and Bloomingdale Asylum, for the year 1869.

From Joseph Juliand, volumes of Transactions for the years 1851, 1853, 1855, 1859, 1861, 1862 and 1863.

Annual Report of the Board of Regents of the University of Wisconsin for the fiscal year ending September 30, 1869; from W. W. Daniels, M. S., Professor of Agriculture and Analytical Chemistry.

Report of the Superintendent of the Department of Labor and Agriculture of the State of Maryland, for 1868 and 1869; Report of the Oyster Resources of Maryland, by H. Davidson, Esq., Commissioner State Oyster Police Force; and Annual Report of the Commissioner of the Treasury Department for the year 1866; Annapolis, Md.; From Peabody Institute, Baltimore, Md.

Seventeenth Annual Report of Public Free Libraries of Manchester, England: 1868 and 1869.

Commelinaceae Indicae, imprimis Archipelagi Indici, adjectis nonnullis hisce terris alienis; auctore Carolo Hasskarl, Ph. D.; Zoological-Botanical Society of Vienna, 1870; through Dr. Flügel.

The Cornell University Register, 1869–70; from Hon. G. W. Schuyler, Treasurer.

Catalogue of the Library of the Corporation of London; ninth supplement; 1869.

Report of the State Militia of the Dominion of Canada for the year 1869; Ottawa; from Major L. A. Huguet Latour.

From J. L. Tappan, Esq.; the Agriculture of France of the Regions of the South and South-west (2 volumes).

Lectures on the Preservation of Health, by Charles A. Cameron, Ph. D., M. D.; 1 vol. 16 mo., pp. 182, illustrated; Cassell, Peter & Galpin, London and New York;

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and Report on Public Health, by Charles A. Cameron, Ph. D., M. D.; Dublin, Ireland; from the author.

From Professor Henry, Smithsonian Institution, Smithsonian Miscellaneous Collections, vols. 8 and 9; also Smithsonian Contributions to Knowledge, vol. 16, 1870; Washington, D. C.

Upon the theory of the support of Animal Organism; an address by Prof. Carl Voit; Munich.

Agriculture and Education; an address before the Agricultural Society of Clermont (Oise), by Felix Hèment; from J. L. Tappan, Esq.

From Dr. A. Crestadora; Index Catalogue of the Chief Lending Library at Campfield, Manchester.

From T. S. Gold, an address on the Natural History and Pathological Osteology of the Horse, delivered before the Annual Meeting of the Connecticut Board of Agriculture, by N. Cressy, M. D.

The Industrial Arts, their influence upon human progress and culture; an Address delivered before the Board of Agriculture, the Faculty and Students of the Michigan State Agricultural College at Lansing, August 25, 1869, by Hon. George Willard.

Address of the President to the Board of Trustees of the Peabody Institute, on the organization and government of the Institute, February 12, 1870.

Salt and its Uses in Agriculture; a Lecture delivered before the State Board of Agriculture, at Pittsfield, Mass., by Charles A. Goessman, Ph. D., December 7, 1869; and Contributions to the Chemistry of Common Salt, with particular reference to our home resources, by the same; from the author.

Annual Report of the State Geologist of New Jersey for 1869; from the author Prof. George H. Cook.

Causes Discouraging the Application of Capital to Agriculture; a Lecture delivered before the Newbury Farmers' Club, by J. J. Mechi, Esq., 1870; from the author; six copies.

The One Hundred Dollar Prize Essay on the Cultivation of the Potato and How to Cook the Potato; from Orange, Judd & Co., New York.

Minnesota as it is in 1870, accompanied by a map of the State; from A. C. Smith, Forest City, Minnesota.

Discourse on the Life and Character of George Peabody, by Seavern Teackle Wallis, Baltimore, Md., 1870; from the Peabody Institute.

Best's Potato Book, containing Henry Ward Beecher's Essay on the Potato Mania; also experiments in Potato Culture, with several engravings; six copies from George W. Best, Utica, N. Y.

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MUSEUM.

George M. Wickersham, Shaker Village, New Lebanon, N. Y.; a circular saw 12½ inches in diameter, said to have been forged in 1792, by Benjamin Bruce, of New Lebanon, N. Y.

Stalk of Small Rice Corn, bearing six ears; grown and presented by Vt A. Houghton, Cardiff, Onondaga county.

Mr. Thompson Burton, Fultonville, N. Y.; an old style neck-yoke, such as was used by the early Mohawk farmers.

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